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CONTENTS.

Editorials:
Notes 697
Columbia—150 Years 698
A Question of Ventilation 699
Re-Grinding 699
Market Conditions 700
Metallics 700
Discussion:
The Royal School of Mines . . . . *Ernest R. Woakes* 701
Graham Island Coal . . . . . *George S. Rice* 701
Two Sides of a Shield . . . . . *M. E. G.* 701
*Valuation of Prospects . . . . . *Blamey Stevens* 702
What is a Slime? . . . . . *Herbert A. Megraw* 703
Western Slate Deposits 703
The Point of View . . . . . *Walter C. Kerr* 703
*Copper Mines of Lake Superior.—IV. *T. A. Rickard* 705
The Transvaal Mines . . . . . *J. H. Curle* 707
The Time-Swing of Balances . . . . . *Chas. S. Palmer* 707
*The Bradford-Carmichael Process . *Donald Clark* 708
The Chemistry and Metallurgy of Copper.—II. . . . . *Chas. S. Palmer* 709
Some Anthracite Statistics 710
Evaporation of Solutions 711
Magnetite in the United States 711
*A New California Pipe Line, *Special Correspondence* 712
*Treatment of Slime by Cyanidation in the Black Hills . . . . . *Chas. H. Fulton* 713
*Coal Mining in Saxony 714
Mineral Production of India 715
Books Reviewed 716
Books Received 716
Correspondence:
Prospects of the Zinc Industry . . . . . *H.* 717
Abstracts of Official Reports:
Republic Iron & Steel Company 717
Anglo-Sicilian Sulphur Company 718
Questions and Answers 718
Recent Decisions 719
Patents Relating to Mining and Metallurgy:
*United States 719
Great Britain 720

Illustrated.

DEPARTMENTS.

Assessments 734
Chemicals and Minerals:
New York 731
Foreign 732
Coal Markets:
United States 729
Foreign 727
Dividends 734, 736
Financial Notes:
Gold and Silver Movement 732
Prices of Foreign Coins 732
Industrial Notes 725
Iron and Steel Markets:
United States 730
Foreign 731
Metal Markets:
Silver 732
Copper, Tin, Lead, Spelter, and Minor Metals 733
Mining News:
Summaries—Bisbee, Denver, Houghton, Paradise, Ariz.; Salt Lake City, San Francisco, London, Monterey, Perth, Sydney, Toronto, Victoria 721
United States 726
Foreign 727
Mining Stocks:
Market Reviews 728
Quotations 734, 735
Obituary 724
Schools, Technical 724
Societies 724
Trade Catalogues 725

EDITORIAL.

BY REASON OF a reorganization of the editorial staff of this JOURNAL, Mr. Samuel Sanford gives place to Mr. Charles S. Palmer. Mr. Sanford has given good service for seven years and he leaves us as a friend.

It is with much pleasure that we are enabled to announce that Mr. Charles S. Palmer becomes an associate editor of THE ENGINEERING AND MINING JOURNAL. Mr. Palmer is an alumnus of Amherst College, where he took the degrees of B.A. and M.A.; he is a graduate of Johns Hopkins University, whose degree of Ph.D. he holds, and also of the University of Leipzig. For fifteen years Mr. Palmer was professor of chemistry at the University of Colorado, for a year he was president of the School of Mines, in the same State, and later he was chief chemist to the Anaconda Copper Company, from whose service he comes to us. It may be taken as indicative of the high aims of modern technical journalism that a man possessed of such a training should be glad to join the editorial staff of this JOURNAL.

REGARDING certain communications which were published in this JOURNAL in its issues of February 28 and July 18, 1903, concerning the affairs of The Copper King, Ltd., and Mr. William H. Daily, it is proper to say that the publications were made as a matter of news sent us by our special correspondent, and without further examination on our part into the matter, and that this JOURNAL disclaims any intention to prejudge any facts therein stated which may be the subject of dispute.

ENCOURAGED BY ITS investigations, the General Chemical Company, one of the largest manufacturers of sulphuric acid in the world, has begun the erection of a plant at Pulaski, Va., to utilize the pyrrhotite ore that abounds in the South. A subsidiary company, the Pulaski Mining Company, recently incorporated with a capital of $500,000, will work the mineral-bearing land, comprising 30 acres in Virginia. The Herreshoff desulphurizing furnace will be employed, just as is being done at Sault Ste. Marie, where pyrrhotite analyzing, after concentration, about 28 per cent sulphur, 3 per cent nickel, 0.5 per cent copper, and 50 per cent iron, is roasted at low cost. It has been shown at this plant that the yield of sulphur

dioxide gas is strong enough to permit its use in the sulphite pulp industry, and also that a good quality of sulphuric acid may be made for the preparation of artificial fertilizers. At the General Chemical Company's works in Virginia an appreciable economy is expected from the sale or utilization of the iron residue for making pig iron. This, being the first practical demonstration of the commercial value of pyrrhotite ore in this country, will be watched with interest as the industry is developed.

MINING IN British Columbia has been rather dull during the current year, and there is no marked improvement in output, although the lead bounty of $15 per ton, on metal smelted in Canada, has stimulated the operation of mines producing lead ores low in silver. In the Slocan the effect has not been so marked as elsewhere in the province, chiefly by reason of the indecision of many of the operators in regard to the disposal of the zinc, for which as yet they are not receiving satisfactory prices when the product contains any considerable amount of silver. However, even in this matter improvement is anticipated.

THERE HAS BEEN a substantial increase in the dividend payments by American metal mines, initiated by better prices for their products, and also by the gradual recovery from prolonged labor troubles, notably in Colorado. In October, 37 of these properties reported to THE ENGINEERING AND MINING JOURNAL dividends aggregating $3,103,250, an amount that is equivalent to nearly three times the payments made by 23 industrial corporations, a rather unusual occurrence. No less than six mines have declared bonuses, and of these, three—the Alaska-Treadwell, the De Lamar, of Idaho, and the Wolverine, of Michigan—have already returned more than their authorized capitalization. The dividends paid during the month by 60 metal mines and industrial companies reached a total of $4,734,800, distributed as follows: Thirty gold, silver and lead mines, $2,708,504; three copper, $345,697; three zinc, $19,049; one quicksilver, $30,000; five coal and coke, $687,583; two iron and steel, $154,750; twelve California oil, $80,217; four chemical companies, $709,000.

In addition to the above, Americans shared in the dividends of $543,300 paid by four Mexican properties, and $52,500 by two Central American.

THE REPORTS OF several of the minor iron and steel combinations, which have recently been made public, show a remarkable shrinkage in profits during the year. The period covered by most of them is the second half of 1903 and the first half of the current year. In most cases the losses in net earnings are very much greater than those in the volume of business done, as was to be expected. As a rule, they constitute evidence of the difficulties which must necessarily be encountered by combinations capitalized on the basis of 'boom' prices. It is probable that the present revival in the iron trade may help some of these combinations and enable them to postpone reorganization—at least until the next period of depression comes.

CURRENT REPORTS indicate that the control of the New York, Ontario & Western railroad, with its considerable properties in the anthracite coal regions, will soon pass—if it has not already passed—into the hands of the New York, New Haven & Hartford Company. This is not an unexpected result. Since the New Haven company acquired control of the Poughkeepsie Bridge line last year, it has been looking for a direct connection with the anthracite coal region, which would make it possible to utilize that line. For a much longer period, indeed, the New Haven has been searching for some such connection, which might enable it to exercise the same control over the coal trade of southern New England that it now has over the freight business, and to secure a longer haul over its lines for the coal which now reaches that region mainly by way of the Long Island sound ports. The Ontario & Western is the only anthracite road which has been for sale; it is also the road which connects most directly with the Poughkeepsie Bridge line, and its purchase by the New Haven company seems to be a natural result.

The weak point in the new arrangement for a direct coal line to southern and central New England is the Poughkeepsie Bridge itself. That structure was built so long ago that it is not able to carry continuously the 100-ton locomotives and 50-ton cars which are now essential in the economical handling of coal traffic. It will require a costly reconstruction to bring it up to the present standard.

OFFICIAL RETURNS show that the gold produced in the Canadian Yukon for the nine months ending with September this year was $8,593,734, that being the amount on which the government royalty of 2.5 per cent was paid. Adding two districts from which returns were incomplete, and also some gold which may have escaped royalty, the total for the nine months was about $10,000,000. As the Yukon working season is over, the probability is that the total for 1904 will be somewhat less than the $12,500,000 reported last year.

THE STRIKE of the hoisting engineers at the Illinois coal mines, which has been pending for some time, now seems to be actually called. It will compel a stoppage of work at many mines, though the miners are not directly concerned in it, and have, apparently, no desire to stop work. The time is hardly well chosen. All through the summer there has been an over-production of coal; prices have been low, and there is an accumulation of stocks. It is true that winter is coming on, when a better demand may be expected; but many mine operators will not object to a stoppage which will enable them to work off the surplus and to advance prices. At any rate, a strike in Illinois will not cause shortage of coal, except at a few local points near the mines.

COLUMBIA—150 YEARS.

The sesquicentennial of King's College, as marking an epoch in the history of Columbia University, is an event which has been fittingly celebrated during the past week by ceremonies and speeches stimulating to the citizen of New York and inspiring to the alumni of a great institution of learning. The imagination of any man of education must respond readily to a story of development which is associated first with the names of Alexander Hamilton, President Samuel Johnson and Chancellor Robert R. Livingston, through a long list of forceful men, forming a historic record, carried forward continuously upon the current of events, until the small college on the King's farm became at last the great university crowning the heights of Manhattan island, above New York city—above the city, yet in it—apart from it, but a part of it—a product of marvellous industrial progress and a contributor to the forces active in that progress—a sign to all men that the efficiency nurtured at the gateway of a continent remains indissolubly linked to the democratic ideals of a great people.

To the readers of this JOURNAL Columbia is known chiefly by reason of her successful School of Mines; that is, we gauge the effectiveness of her teaching by the efficiency of those of her graduates whom we know best—and they are the professional men who secured their early training at the School of Mines, founded in 1864. At first it was but an experiment, the first of its kind on this side of the Atlantic, and started at a time when the European schools offered the attraction of great names in the young sciences contributory to the technology of mining and metallurgy. These forty years since 1864 have been well used; they reach from the beginning of an earnest endeavor to the fulfilment of a high purpose, carried out amid the cordial recognition of friends and competitors in every civilized country. The laying of the foundation stone, last Monday, of a new and separate School of Mines building, donated by Mr. Adolph Lewissohn, one of those whose fortunes were built upon the appreciative employment of technical knowledge, is an event which mining engineers all over the world will applaud. The School of Mines deserves high honor from the rest of us, for whether it be the mathematical training under Van Amringe, the commercial astuteness inherited from New England ancestors, a Brooklyn nativity or a New York environment, whether the cause be any one of these, or a mutual reaction between all of them, the fact remains that the Columbia men

have won a commanding position among captains of industry and leaders of applied technology. The average of efficiency has been maintained from the very first; the three classes graduating in 1867, 1868 and 1869 included men of such high professional repute as John A. Church, Frederick A. Schermerhorn, William B. Potter, Wm. H. Van Arsdale, Henry B. Cornwall, W. P. Jenney and Henry S. Munroe; they have been succeeded year after year by other men, the names of whom are so representative that it would be a pleasure to quote them, did space permit; but are they not found in the chronicles of mining and metallurgy, in the pages of this JOURNAL? The thirty-nine years covering the existence of THE ENGINEERING AND MINING JOURNAL run parallel in point of time with that of the Columbia School of Mines; therefore on this auspicious occasion we make cordial acknowledgment of the generous support which the Columbia men have ever given to the technical literature of the profession to which they belong and to the service of which our labors are dedicated.

A QUESTION OF VENTILATION.

On another page we publish a letter asking for assistance in the matter of determining how best to ventilate a so-called mining 'tunnel,' more properly an adit, in Mexico. It is not within our province, as a rule, to give information which mine operators should obtain from engineers in a professional way, but in this case the subject is one of general interest, and we have departed from precedent in order to discuss the matter for the benefit of our readers, many of whom will have their own ideas in regard to so practical a subject. The expression of such ideas in our columns will be welcomed.

There are two common ways of promoting ventilation in an exploratory working; one is to create a draft by leading a pipe from the working face to a stove outside. This is a method often employed in the Rocky Mountain region, and it is one which cannot be too severely condemned; it is extremely dangerous. Many a miner has lost his life by a reversal of the air-current, due to a sudden change in the barometric pressure, and the consequent escape of fuel-gas from the stove into the mine. Another method used by prospectors wherever a steady stream of water issues from an adit or 'tunnel' is to cause the water to fall close to the mouth of the ventilating pipe in such a way as to suck the air out of the mine; this method is safe and simple, but it is only efficient on a small scale and for a short length of adit.

In considering the case submitted by our correspondent, it is evident that the cost of installation will be the same for forced as for suction ventilation. In both cases it is necessary to lay a pipe to the working face itself, for it is nearly useless to blow air into, or draw it from, the mouth of an adit, several hundred feet distant from the place where work is proceeding. With the dimensions given, the adit area would be 42.25 square feet, or 12,675 cubic feet for 300 feet length of adit. Ventilation after firing a blast does not depend entirely upon the laws which govern the diffusion of gases, for the products of the combustion of powder are partly solids. It is more effective to push them out bodily, by filling the adit with fresh air behind them, than to draw them out by suction. The pipe is almost always laid at one side and near the roof. The radius of currents going into the pipe by suction will in time reach to the far side of the tunnel, but not until a large amount of comparatively fresh air has followed the first portions of foul air into the pipe. More blowing must be done to remove the entire quantity of foul gas when suction is used than with forced blast. We do not know of any determinations on the subject, but should suppose that the entrance of fresh air at the face to the amount of 300 feet of adit capacity would clear the air perfectly. This would not be much of a call on even a small blower.

Visitors to the long Alpine tunnels have described the passage of a cloud of foul air from a blast, perhaps a mile away from the face, as it passed out in advance of the fresh air which was supplied to the face. It seemed to move in a fairly coherent body. They were in it for a moment, and out of it again and in the good air beyond in a minute or so. It is probable that for working purposes in the small adit of our correspondent, a few minutes' blowing would give the men a perfectly good working place, and it is this feature which makes forced ventilation superior to suction.

We do not know of any experiments to determine how much blowing is required to produce good ventilation at the breast after firing, and have suggested 300 feet of tunnel capacity merely as a quantity that ought to be ample. It is probable that for working purposes in the small 'tunnel' of our correspondent a less quantity of air would suffice to let the men go to work. Our correspondent mentions one hour as the maximum time allowable; but such long blowing is not needed before starting work again. A No. 2 Sturtevant blower, with 7.5-inch exhaust, delivers 400 cubic feet per minute, and would fill 300 feet of the adit in half an hour. A No. 3, with 9-inch exhaust, delivers 600 cubic feet, and would do the same work in 21 minutes. Apparently the situation of our correspondent may influence the selection of pipe. A 7- or 8-inch diameter pipe will carry the delivery of either of these machines easily. Even an ordinary 5-inch stove-pipe would carry 400 cubic feet per minute with a velocity of 50 feet per second. This would require more power, but, in fact, the cost for power is not great. The friction in a 7-inch pipe 1,500 feet long would absorb about 2.5 horse-power, for 600 cubic feet air per minute, and in a 5-inch pipe, about 10.6 horse-power. With a delivery of 400 cubic feet per minute, the friction in a 5-inch pipe consumes only about 3.5 horse-power. These determinations are based on well-made and well-set pipes, and will be greater by perhaps 50 per cent in rough work. The larger pipe is, of course, the best, and unless our correspondent intends to use mechanical ventilation permanently, the light sizes of sheet iron will do. For permanent use, galvanized iron is required. In any case, the pipes are made in 12 or 15 feet sections, with stove-pipe joints, and the last three or four sections are taken down before blasting and carried back to a place of safety. The fan capacity given here is for well designed and constructed fans, which, however, are cheap in these small sizes. Any of the well-known makers will furnish details; their catalogues give trustworthy data of friction, etc., as well as sizes and air capacity. The 5-inch pipe we have mentioned may seem ridiculous for so long an installation, but our correspondent's situation is peculiar. With gasoline at 45 cents, he would probably find a 600-foot capacity blower and 7.5-inch pipe the cheaper. Made of 28-gauge, the pipe would weigh 1,800 to 1,900 pounds for 1,500 feet.

RE-GRINDING.

South African mill-practice is in an interesting position. As a consequence of the successful application of tube-mills to re-grinding the product of the stamp-battery, the tendency is to increase the capacity of the existing mills by crushing coarsely under the stamps, the further reduction required before cyanidation being effected by the re-grinding machinery referred to. It is a metallurgical development of great interest, hailed as an evolution *per saltum* by the scribes of the financial press, and recognized as the revival of an old idea by those who are experienced in milling methods. As early as 1890 Messrs. McDermott and Duffield wrote of the enlarged capacity to be obtained in a mill using re-grinding as a supplement to stamping, the coarser product being separated previous to treatment in Heberli, Huntington or other grinding machines. This method was adopted at the Grand Central mine in Mexico. Throughout the West pans were long used for re-grinding, and they are now in successful employment for this very purpose at one or two of the Kalgoorlie mines. Why, then, this sudden recrudescence of re-grinding as a metallurgical principle?

Re-grinding has been tried in various parts of the world during the last twenty years—not to go so far back as the history of the Mexican *arrastre*—and has been discarded simply because of its expense; all re-grinding machines have proved, in proportion to their output, which is comparatively small, to be wasteful as regards power consumed and wear of iron. So long as the grinding took place between faces

of iron, the quartzose constituents of the ore produced excessive wear and tear; now by employing a machine which presents a grinding surface capable of being lined with a material harder than iron, containing, in fact, the resisting elements of the hardest ore, it is practicable to grind rapidly and cheaply. Here is the salient feature of the recent adoption of an old method.

In the Lake Superior copper region all kinds of re-grinding apparatus—except tube-mills—have been tried with a modified success eliciting no particular enthusiasm. With the Huntington, Heberli, and Chilean mills, with rolls and other devices, the cost in power and iron has been such as to render re-grinding a successful precaution against accident in the course of successive operations, rather than an economic reduction of imperfectly comminuted millstuff. From data recently obtained it appears that the most successful re-grinding—by Huntington and Chilean mills—involves a cost of 20 to 35 cents per ton. The crude ore is a comparatively soft amygdaloid or a hard conglomerate, but, of course, whatever be the character of the rock sent from the mine, the material subjected to re-grinding constitutes the most resistant particles of silicious mineral, and the more the metal to be extracted has impregnated this harder portion of the ore, the greater the need for re-grinding. Hence the importance of this supplementary treatment to the Calumet & Hecla.

It is obvious that our friends at Houghton and at Johannesburg ought to come together and compare notes. Geographic considerations present an obstacle which discussion in this JOURNAL can obviate.

MARKET CONDITIONS.

November 2.

The metal markets continue generally active and in good condition. Copper is very strong and again shows advancing prices. The foreign purchases are large, and have been apparently hardly at all hindered by the temporary war scare. Chinese buying in this market also continues, and this unprecedented demand from the far East promises to furnish considerable trade to our exporters. Domestic buying has also been very good, and the advance in prices seems to have induced many consumers to lay in stocks which they were reluctant to purchase when prices were lower.

Tin continues strong, with only moderate fluctuations. The demand for lead is also very good, and while prices are unchanged, spot metal appears to be scarce, and there are reports that premiums have been paid for early deliveries. Spelter is firm, and consumptive demand appears to be good.

Silver has been steady, with only slight fluctuations. Exports from New York continue large, and demand from the East seems to be a little better.

The iron and steel trades are strong, and buying, both of pig iron and finished material, continues on a large scale. Prices are already advancing, and sellers are somewhat inclined to hold back on future deliveries, anticipating further advances. A speculative tendency is also developing in pig iron, and it is not impossible that some of the buying reported has been on this account. The danger of the present situation is that prices may advance too rapidly, and so check the consuming movement. The United States Steel Corporation is reported to be arranging for large purchases from outside interests, possibly with a view of securing control of the general pig iron market. It is impossible, however, to ascertain anything definite with regard to this, and the rumors are given for what they are worth. It may also be noted here that a fight is apparently on among the railroad interests, and it is given out that the Steel Corporation has ordered that no freight from Pittsburg shall be given to the Wabash lines. This is an outcome of the existing trouble between Eastern interests and the Colorado Fuel & Iron Company, which, like the Wabash, is a Gould corporation.

The western coal markets show some improvement. Lake and domestic trade is steady, and demand for steam coal is generally good, though there are some local exceptions. In the Pittsburg district an advance in prices is expected. The suspension of work at a number of the Illinois mines, on account of the strike of the hoisting engineers, may have a considerable effect upon the trade.

There is little change in the anthracite market, except that demand is improving with the approach of cold weather and the general putting in of stocks by local yards and domestic consumers.

In the seaboard bituminous trade some improvement is manifest. Coastwise freight rates are still rather low, and the tendency to hurry shipments to the far Eastern ports, which is usually manifest at the end of the season, has not yet presented itself.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

It has been ascertained that the whole region of the Great Lakes is undergoing a slow tilting to the southwest. The waters of each lake are rising on the southern and western shores and falling on the northern and eastern shores. At Toledo and Sandusky the advance of the water amounts to eight or nine inches in depth in a century.

The change of sedimentary rocks into metamorphic types does not necessarily involve the working of violent dynamic forces. When sediments have accumulated to great depths, the lower layers are affected by the weight of those above, by the earth's internal heat and other causes which promote chemical and mineralogical changes. The result may be a metamorphic rock that shows no evidence of its sedimentary origin.

Among Mexican mining terms may be mentioned the *vetas ocultas*, or blind veins, also called *filones sin crestones*, the *caballetes* and *tabiques*, which stand for horses of country (or *panino*), the *quemazones* or black cintery manganese ores, which form a division of the *colorados*, or oxidized ores, as distinguished from the *negros*, or sulphides. *Guardas* are selvages and *lamas* is pulverulent ore. Bands are *cintas* and *en boleo* describes small pockets, just as *ojos* means little bunches, in isolated spots called *moscas*. *Buscones* are those who search for ore in abandoned mines in Mexico; they are similar to 'tributers.' The word is derived from *buscar*, to search. Closely related are the *rebotalleros*, who restrict their search to mine dumps. *Gambucino* describes one who seeks ore generally on his own account; he is indeed the *buscador* of the Spanish, the *faizquiero* of the Portuguese and the 'prospector' of the English-speaking people, the 'fossicker' of Australia and the 'hatter' of New Zealand.

Platinum of atomic weight 195, specific gravity 21.5, fusing point 1,750° C., the most malleable metal known next to gold and silver, resists oxidation at high temperature, and is unaffected by acids. The world's production ranges annually between 160,000 and 170,000 troy ounces, supplied chiefly from Russia, and Colombia, South America. Owing to the war in the Far East the price has advanced to $19.50 per oz. for ingot platinum at New York, which is nearly the valuation of gold, and about 34 times that of silver.

In the beginning, ferro-alloys were manufactured in the ordinary carbide furnace, with slight modifications. Later, when purer materials, especially as regards the amount of carbon present, were in demand, special furnaces had to be constructed. To-day the electric furnace has great efficiency and by the improvements introduced produces alloys that contain little or practically no carbon, thus increasing their value in steel-making.

Metallic bismuth is used in the manufacture of readily fusible alloys and solders. The eutectic alloys known as 'Rose's metal' and 'Wood's metal' melt in boiling water, the former at 94° C., the latter at 60.5° C. They are made by fusing together 100 parts of tin with 100 parts of lead and 200 parts of bismuth (Rose's metal); and 400 parts of bismuth with 200 of lead, 100 of tin and 100 of cadmium (Wood's metal). The metal itself possesses a characteristic ruddy white color and metallic luster and breaks and powders readily; the pure metal when allowed to cool slowly, after pouring, spits like silver. Bismuth salts are, of all heavy-metal salts, least harmful, applied externally or administered internally, to the human system. Some, indeed, the sub-nitrate and the tannate, for instance, are widely used by physicians as antiseptics and digestive aids, and in surgery for healing raw wounds. At the present time the demand for bismuth is unusually brisk, occasioned by the large quantities sent for medicinal and chirurgical purposes, chiefly in the form of sub-nitrate, to the seat of war in Manchuria. Some white salts, especially the oxychloride and the sub-nitrate, when rubbed to a fine powder, possess an unusual creamy, clinging consistency and were used formerly as cosmetics and face powders, but have now given way to the cheaper zinc-white.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of THE ENGINEERING AND MINING JOURNAL.

THE ROYAL SCHOOL OF MINES.

The Editor:

Sir—The editorial on the Royal School of Mines in your issue of September 22 has just reached me. A graduate of that school feels almost ashamed to air his grievances in an American journal, however cosmopolitan that journal may have proved itself to be. The straightforward way in which you have on several occasions taken up the cudgels on our behalf, coupled with the fact that many American mining engineers, working for British mining companies, have also exerted their influence to try to prevent the total extinction of this well-known institution must be my excuse for trespassing upon your space. It would appear that the British educational authorities have never realized the enormous amount of British capital invested in mining enterprises, not only in the British Empire, but in all the countries of the earth; otherwise the central British mining school would be, one would think, the greatest and best school in the world.

In spite of repeated snubs and continual financial neglect, that school has struggled on and has produced men of whom we are all, as you say, justly proud. There are many British mining schools, but there is only one Royal School of Mines. Surely the identity of this parent school must not be allowed to merge and be lost amongst other comparatively insignificant institutions. Every one must admit that a London University degree is second to none in the world; it is even possible to imagine that in the future a London University degree in mining may be of the utmost practical use. One must, however, admit that at present it savors rather of academic than of practical mining excellence. Personally, I am keenly alive to the fact that the Royal School of Mines has been of infinite use to me in a professional sense; scores of others must have had a similar experience. You, sir, as a cosmopolitan mining man, can realize this, though most of your readers on the American continent will hardly credit the statement. Naturally your up-to-date and splendidly-equipped mining colleges, situated, as they often are, in the heart of an active and progressive mining community, must appeal more strongly to the American ideal. However, the fact remains that in the past, and in spite of almost insuperable disadvantages, men from the Royal School of Mines have left an indelible mark on mining and metallurgical practice. I am sure that all these men and their more humble followers will thank you, sir, for what you have already done for the old school, and will join with me in inviting you to put forward some proposition on which a scheme may even yet be worked out, by means of which the *esprit de corps* and identity of the Royal School of Mines may not be lost.

We must remember that this loss will fall not only on ourselves, but on our descendants, some of whom may even now be preparing to follow in the footsteps of those whom they most honor in the career they are anxious to pursue.

ERNEST R. WOAKES.

Linares, Spain, Oct. 12, 1904.

GRAHAM ISLAND COAL.

The Editor:

Sir—In your issue of October 20 there appears an article on 'Graham Island Coal,' some points of which seem to me open to criticism.

First, regarding the seam of anthracite which is mentioned as "proved" in an entry driven 42 ft., Mr. Blakemore says that the adjoining seams are coking coal; later he speaks of "the most valuable seams having been proved at Camp Wilson, nine miles north, where they are 'high-grade, free-burning bituminous coal.'" It would appear that the several coals that he speaks of belong to the same general coalfield, for he makes this comment—"the existence of a wide basin of undisturbed coal at a moderate dip is confirmed by observations made at several points on the surface." He later quotes from Dr. G. M. Dawson, that "Tertiary rocks holding lignite form a large portion of the northern end of Queen Charlotte Island." While I have not visited this coalfield, I think it is safe to say that the normal condition of the Tertiary coal is lignitic, and that it has not been changed to the bituminous stage, except as the result of heavy dynamic movement; nor to an anthracite, unless in the immediate vicinity of (almost contact with) an eruptive. At least, this is the condition with the Tertiary coals in the State of Washington, and even with the older Cretaceous coals of the Rocky Mountains. I, therefore, do not think that any extent of anthracite can be considered as "proved" with a development so limited as is indicated by the description.

Your correspondent is decidedly in error in stating that "in none of the Western States has a clean bituminous coal been discovered near enough to the coast to compete with this coal." While it is true that the bituminous coal seams of Washington have more or less 'dirt' mixed in, the coals can be washed and do enter into competition with British Columbia coals, in the common market, San Francisco, to which point the water carriage is practically the same. The United States Geological Survey reports the following tonnages imported into San Francisco:

	From British Columbia.	From Washington.
1895.....	651,295	407,155
1900.....	766,917	668,642

The imports vary considerably from year to year, but the above are fairly average years, and show how active the competition is.

GEORGE S. RICE.

Chicago, Oct. 26, 1904.

MINING IN MISSOURI.

The Editor:

Sir—In Missouri there are two important mining districts. The Joplin district, in the southwest, is the largest producer of zinc in the United States. The mines of St. Francois county, in the southeast, rank that district as the second largest producer of lead. The Joplin district is also a considerable producer of lead from ore concentrated, as a by-product, in the milling of the zinc ore. Such comparisons as are to be made in this letter are not for the purpose of pointing out the relative merits of the two districts as fields for mining operations, but merely to show in a striking way the baneful results of the labor union policy as applied to mining. Everyone knows what the results have been in Colorado, but—fortunately lacking the gloomy record of outrage and bloodshed—Missouri presents the more instructive industrial picture of before and after, which it can show contemporaneously.

The ore mined at Joplin yields on the average about 4.5 per cent of blende, worth, say, $35 per ton, under the normal conditions of the present time, and 0.5 per cent galena, worth, say, $50, or an aggregate of 5 per cent of mineral worth about $36.50. The ore mined at Bonne Terre and Flat River yields about 5 per cent of galena, worth about $37.25 per ton f.o.b. mines, when lead is at 4c. St. Louis. At Joplin there is great and general prosperity. In St. Francois county the mining companies are struggling along at little or no profit, hoping vainly for an amelioration in the conditions. It is strange that ore of the same grade and value can be worked profitably at one place and cannot be worked profitably at another place in the same State, especially when the physical conditions are all apparently in favor of the unprofitable mines.

At Joplin there are comparatively small lenses of ore and sheet deposits, averaging only about 8 ft. in thickness, the mineralized ground being the hardest kind of chert. The mines are worked in a crude kind of way, opened by small shafts, hoisting ore in small tubs by means of uneconomical engines, and dressing the ore in ramshackle mills of comparatively small capacity, the entire cost of opening a mine and equipping it with plant to treat 10 tons per hour being only about $15,000. At Bonne Terre and Flat River there are immense shoots of ore, affording stopes of 20 ft. to 80 ft. in height, and width almost to suit; the ore an easily mined dolomite, ground of character requiring no timbering, depth of mines only slightly greater than at Joplin, and no greater influx of water, except in two or three instances; the mines opened by fine large shafts, equipped with nearly the most modern facilities; the ore dressed in complete and costly mills of 500 to 1,500 tons daily capacity. Surely St. Francois county has all the advantages of physical condition, and theoretically ought to surpass Joplin in operating costs. The explanation of why it does not involves some technical factors, but the chief cause is to be found in the character of the miners and their work.

The mines of St. Francois county used to make money. The minimum price of lead in the history of that metal did not stop them, and they have shown good profits when lead was considerably less than 4c. per pound. This, however, was before the labor union was organized in the district.

The mines of St. Francois county are operated by large companies. The cost of opening and equipping a mine there is so large that a company with abundant capital is required. For that reason there is no leasing nor any individual operations. The condition of the miners was good; they were paid high wages, as compared with the scale for other trades in that part of the country; the day's work of 10 hours was no longer than was required of other artisans; the mines were sanitary and in no way especially dangerous; the men were well cared for by the companies. The entire mining district is pleasantly situated, far more pleasantly than the average. The climate is good; all the conditions of living are good. The men were well satisfied, and a general air of prosperity pervaded the entire district. This was before the poisons of unionism and socialism were contracted.

In the struggle which ensued the unions were victorious. The companies made no fight in line, shoulder to shoulder. Some of them made no fight at all, and surrendered without a shot. The others fought alone, one by one, and were

overwhelmed one after the other. The unions won an increase in wages, a reduction in working time to eight hours per day, and the victor's right to despise the conquered, which in successful labor wars takes the form of cheating the employer in the work that he pays for. The amount of work done per hour at Flat River is materially less than before the advent of the union. This is the chief reason why the mines of southeastern Missouri are not making money.

Joplin has never been tainted with unionism. It has always been the great camp of the small miner. The capital required to open and operate a mine there is not large, and the operators themselves to a large extent take hold and work with their men. Every hired man wears on his head the hat of a future operator. He saves his money, and sooner or later does some prospecting on his own account. If he is lucky, good for him. If he is unlucky, he goes back to work until he can save enough to try it again. Everybody works hard—works hard every minute of the day, and when the day's work is done he seeks enjoyment in such way as most appeals to him. The general aspect of things at Joplin and Flat River shows at first sight that the Joplin man has the more fun. The man who has done a good square day's work is better calculated to enjoy himself, anyway, than the man who has listlessly loafed through his task. And the Joplin men certainly work. A pair of men break more to the drill in their hard, flinty ground, with no very high breasts to stope on, than the Flat River man breaks in his magnificent chambers in limestone, and when it comes to shoveling and tramming, there is no comparison at all. Nor has the former any kind company to provide him with lavatories and lockers, look out for his safety, and pay him damages for unavoidable accidents. The Joplin man simply takes his chances—often they are big chances—puts in an honest day's work, and gets on in the world if there is anything in him at all. But Joplin has no union. Joplin has the best American spirit, and, consequently, Joplin is prosperous, and can mine 5 per cent ore with little tubs and ramshackle mills and make money, while the far greater deposits of an equally valuable ore in St. Francois county cannot be made to pay a reasonable return on the capital required to work them. M. E. G.

St. Louis, Mo., Oct. 18, 1904.

VALUATION OF PROSPECTS.

The Editor:

Sir—Prospect development is not, like gambling, all a matter either of chance or dishonesty, but it has unavoidably to deal to a great extent with uncertainties which no amount of your genetic classification, or anything like it, can overcome. Considering that the chances ought to be systematically reckoned with, I advanced an idea in this JOURNAL of April 7, 1904, under the title of 'A Logical Method of Valuing Prospects.' This was not, however, meant as a rule of thumb; a little explanation of the principles on which it is founded and the way in which it may be varied to suit actual cases may be of service.

It is evident that a stranger with a general experience would often be fooled by a prospect situated in a district where, unbeknown to him, an abnormally large proportion of the surface showings have failed to develop into mines. The conscientious expert who cannot spare the time to cover a country minutely, therefore finds that he has to confine himself to mines the value of which he can estimate on a basis of ore blocked out, the collateral evidence being a minor factor. Some one has to make the preliminary developments, however, and that some one, whatever you may call him, must not back down and say the evidence obtainable is insufficient to make an estimate of value. All his business focuses on the valuation of individual prospects and, according to the method I previously advanced, this valuation can be deduced as a matter of mean probability from the profits or losses previously made by developing similar prospects in the district. It was taken for granted that the indication stage had been passed, and that the whole width of an orebody had been uncovered. It is of no consequence that the ore of each one of the fifty mines and prospects considered may be recognized apart from the others, unless there is evidence that the more valuable mines carry a distinct type of ore; then the classification can, and should, be carried out further before the estimate of probabilities is made.

Similarly, within reasonable limits, it is of no consequence that the ores of these mines and prospects vary in richness, or the veins in thickness as long as the one in question is of mean size and value; if it is more or less than this we can reckon what the value of the various properties would be if their width and richness were the same as the one in question, and use these figures in the probability summation. Again, the walls may be different in the various prospects, but variations of this character are not minute, and their connection, if any, with the proved continuity of the more advanced prospects can easily be recognized and brought within the scope of classification.

Another point for careful discrimination is what I have called the "district." The prospect in question may belong to a zone in which are situated several valuable mines, or it may lie among comparatively valueless prospects of similar type in the territory adjoining the valuable zone. In either case what is meant by the "district" is clear. If there is no well-defined boundary between one district and an adjoining one in which the same type of deposit occurs, and the prospect lies in the doubtful territory between the two, we can evidently deduce two valuations and take their mean. All these component factors, and many more of a similar nature, can be adjusted by the aid of ordinary good judgment; it is a very different thing to trying to fix the mind on something between nothing and twenty thousand dollars in one operation.

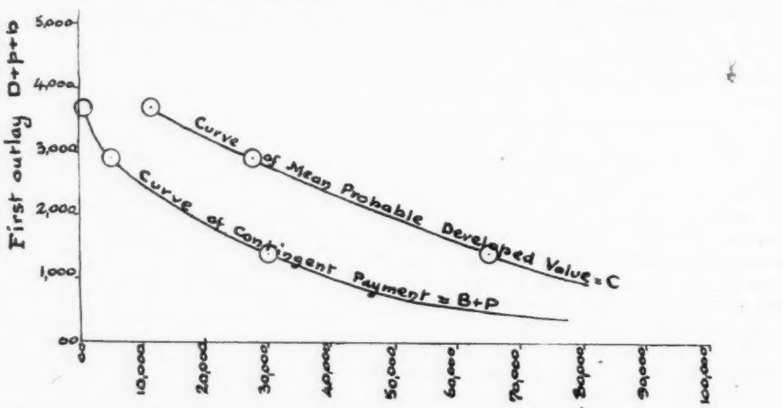
I have not previously considered any other than simple or cash valuations, and it might be well to apply the method to the usual form of bond payments. In this case the risk is divided in certain proportions between the prospector and developer, and the summation of probabilities becomes much more complex.

Let I represent the net profits, realized or estimated, of each individual mine or prospect, of the proper size and class of surface showing in the district, after deducting the development charges normal to a mine situated similarly to the one in question.

Let n be their number; b the preliminary payment; B the contingent payment; C the mean of all values of which I are greater than B; D the estimate of mean development considered necessary to bring the mine to the mean value C; L the probability of the mine value being greater than B; p the profit and expense reimbursement on preliminary payment and development outlay; P the profit and expense reimbursement on contingent payment. The balance of probabilities is then represented approximately by the formula:

$$L\ (C - [B + P]\ ) = b + D + p$$

To apply this we may take the case of the district previously considered. In this case, we take a summation from B upward; and,



whether there are one or several equal values of I, only one-half of them are considered as being in excess of the corresponding value of $B + P$. Working out the formula on this basis, we find that on a bond of $5,000 contingent payment (and profits) there is a margin of $2,900 for development (to a mean $27,308 basis) and first payment, etc.; while on a bond of $30,000 there is only a margin of $1,400 for development, etc., to a basis of $65,000 mean value, or $30,000 minimum value.

In order to arrive at intermediate values, a diagram may be drawn from the above data, as shown above; also by this means, inconsistencies (arising through the number of prospects taken as data being too small to make a smooth curve) may be corrected.

In the foregoing scheme the assumption is made that certain definite estimates of development work can be made; this generally holds, though there are certain cases where other methods might better apply. A new district is especially hard to work upon; but it is not sufficient even then to judge from a general experience of mines of a similar type; the material necessary must be the complete data of success and failure in similar districts—preferably of the same region.

The single risks of prospect development much exceed what can be reasonably expected as profit, but by combining enough properties under one capitalization, the percentage risks can be reduced to any desired extent. The all-important point is to rightly value each individual prospect; by getting any one of them a

little too low business may be lost and expenses wasted, and by getting any one of them a little too high the profit is obscured.

BLAMEY STEVENS.

Valdez, Alaska, Sept. 15, 1904.

WHAT IS A SLIME?

The Editor:

Sir—In an editorial appearing in the JOURNAL for October 13, 1904, under the title 'Tube-Mill and Filter-Press,' I find a number of interesting statements, the greater part of which I heartily endorse and know to be true. The advent of the tube-mill will surprise many by its thorough and economical work, and the surprise of the average millman will be even greater when he begins to realize that the tube-mill, properly and intelligently managed, can, and in all probability will, open a way by means of which the mining world may rid itself of the thunder of the stamp-mill. That result is only a matter of a short time, and it is interesting to note the first thrills of the movement.

There is, however, one point mentioned that I hope you will permit me to dispute with you. That is upon the question of slime. We are agreed that the general opinion of what constitutes a slime must be revised, but it seems to me that the statement "Rock so comminuted that it will pass through a sieve having 200 holes per linear inch—that is, a 200-mesh—becomes slime when mixed with water," is open to question. Take a sample of quartz and crush it through a 200-mesh sieve, then take the resulting mass and wash it thoroughly, taking away only that portion which the water carries with it after the whole remains quiet a few seconds. You will then have left what I should call a perfect sand. It has all the qualities that any sand can have. Its particles are round, it will settle in comparatively quiet water, it is capable of rapid and thorough leaching, and it has none of the properties of what it has been my custom to regard as slime. Take a sample of this clean 200-mesh product and dry it in a pan over any kind of a fire. It dries quietly and thoroughly without any puffing or spitting, the dried surface does not crack, for the particles are sufficiently separated to allow the passage of the steam without disturbing the equilibrium of the mass; on the contrary, if a pure slime is dried in the same way it will dry with a constant boiling and sputtering, as the particles of the mass lie so close together that the passage of steam is not permitted. The dried mass is hard and compact, showing cracks and holes where the steam has escaped. Sand dried thus is easily broken up in the fingers, while slime treated in the same way requires some crushing treatment, varying more or less with the chemical nature of the material. It seems to me that a definition of slime may not be based upon its fineness nor yet upon its applicability to any particular treatment. The recognition of the matter at hand is readily recognizable when it is encountered in practice, but the line certainly cannot be drawn at a 200-mesh product. It would be a great blessing if someone would give us a definition that would suit the case, but it seems almost a hopeless task to attempt it.

It might be thought that a dispute upon such an apparently slight and insignificant matter would be futile, but the fact is that so much depends upon a proper interpretation of terms that it appears to me to be well worth all the argument that can be advanced by those who are acquainted with the subject. The decantation process, which, up to date, is the most widely used and economically the most perfect system of cyanidation, depends vitally upon the recognition and separation of the two bodies. And even in the advanced filter-pressing methods it is important that the bodies be separated, because leaching is as perfect a method as any for the extraction of gold and silver by cyanide, and is much cheaper than filter-pressing. No one will care to filter, in a press, a product that is readily leachable, and a clean 200-mesh sand is readily leachable.

HERBERT A. MEGRAW.

Candor, N. C., Oct. 19, 1904.

WESTERN SLATE DEPOSITS.

In a recent monograph prepared for the Geological Survey, Mr. Edwin C. Eckel says that the only important slate-producing area in California is in Eldorado county. Eureka quarry, the most important slate operation in the State, is at Slatington, near Kelsey, in that county, and is now worked on a large scale. The structural relations in this quarry are very interesting, and are fully described in the monograph.

The mass of the Eureka quarry product is a dense, deep-black slate, which splits very finely and has a smooth, glistening surface much like that of the Bangor and Lehigh slates of Pennsylvania. The frequency of pyrite nodules and of ribbons or bands of material differing in composition from the mass of the slate, prevents its use as mill stock. As roofing material, however, it is excellent.

A band of green slate several feet in width crosses the Eureka quarry. It is thought to be a dike of massive igneous rock which has been changed by pressure, subsequent to its intrusion, into a slate. It is grayish-green in color and splits readily, though not with as smooth a surface as the black slate. It stands punching and trimming well, and is sufficiently strong for roofing use. Considering its origin and composition, it is probable that it will be a highly durable slate, holding its color well. It is sold at present for trimming and lettering on black slate roofs, a purpose for which it is artistically well adapted.

Mr. Eckel also describes two other quarries of this locality, belonging, respectively, to the Chili Bar Slate Company and the San Francisco Slate Company. Both have been idle since 1897. Neither of these quarries has gone deep enough to reach the really good slate, which might have been found at greater depth.

The Eldorado county slates have practically no competition on or near the Pacific coast, and the Eureka quarry has recently placed large shipments in Hawaii and Guam.

Mr. Eckel closes his paper with some notes on the slate deposits near Provo, Utah, which have been exploited recently to a small extent. They furnish green and purple slates, the latter apparently in greater abundance. The green slates show little tendency to cleavage in their surface outcrops, and probably will be less satisfactory for roofing purposes than the purple. The green slates rub very smooth, however, and would make good slabs or mill stock, if obtainable in masses of sufficient size. The purple slates split easily and would seem to bear punching well.

The best diamonds for drilling are those nuggety in shape, with well-defined angular projections. Flat stones are to be avoided, first, because of their liability to 'fly,' and secondly, because of the difficulty of keeping them securely in the setting.

THE POINT OF VIEW.*

BY WALTER C. KERR.

A review of knowledge shows the great preponderance of the intellectual over the material, and it is only within late centuries, in fact, almost the past century, that the human mind has seemed capable of turning from the lesser resistance of intellectual attainment to the greater capacity for physical observation and comprehension. We have but recently come to the era of intense mental operations, dealing with laws and principles which require insight greater than the intellect can grasp unless aided by the senses. Contrary, therefore, to common belief, I assert that the highest refinement of knowledge follows from the highest use of the senses; and that it has taken thousands of years of pure intellectual development to attain a state in which the powers of nature can, through the human intellect, be made useful to mankind, and add largely to knowledge. I hope for the time when the spirit of engineering as found in practice will form a more definite part of engineering education. This, I think, must come through the professor's keeping in close practical touch with the engineering world. There are various ways in which this may be accomplished, but I know of none better than by each professor's doing a reasonable amount of practical work for commercial purposes. Under some conditions, this may be consistently accomplished during a portion of his time, but I am inclined to think that eventually our professors will devote all their time to instruction while they teach, and go periodically into the world, a few years at a time, for practice.

We hear much about opportunities. They are everywhere plentiful. Remember that your opportunity is the little one that lies squarely in front of you, not the large one which you hope to find further along. Many a man is surrounded with opportunities who never seizes one. There are traditions that Adam, William Tell and Sir Isaac Newton each had an affair with an apple, but with different results.

From one point of view, all graduates can be divided into two classes: those who think their knowledge is a little long for their opportunities; and those who think most anything is a little long for their knowledge. Both are apt to think that the knowledge they have acquired will become the essence of performance. You will soon find that knowledge hasn't much to do with effectiveness. It is necessary, only as words are essential to the expression of thought. You will find knowledge a good tool, but not the vital force with which you perform. You will fall back upon human effort and action, and find that it is the human-engine and not the knowledge-engine that does the work.

Cultivate singleness of purpose. This is more important than you may think. It is intuitive with the comparatively ignorant, and often absent in the highly trained. We are frequently surprised at the great competency of the ignorant contractor or foreman, on whom judgment is often passed by saying that he is a practical man and gets results. Analysis will show that his best quality is singleness of purpose, which leads him to do vigorously the one thing before him, without distraction following from knowing or thinking about too many other things. The broad-

*An address delivered to the graduating class of the Stevens Institute of Technology, on Thursday, June 16, 1904.

ening power of education and training increases the range of contemplation, but unless the power of concentration is cultivated there follows a tendency to scatter, instead of to acquire that singleness of purpose which leads to effective action. The highly trained man, therefore, needs, as a complement to his training, unusual powers of concentration. This faculty a man must have or acquire himself. It is not in the books. It cannot be taught. It can only be suggested by precept and example.

From directness of purpose naturally follows diligence in getting what you go after, and not being easily turned aside by resistance. When you are getting what you go after, get it all. Avoid the mediocrity of compromise. Be thorough and stand for full competency in everything, from main essentials to details. Just so far as education, assisted by concentration, contributes to singleness of purpose it is useful, but where by length, breadth or depth it dilutes human effort, it lacks value. It is, therefore, not so much the question how much educational training you have as it is how you use it. Some can use a little with great effect, because their point of view is right; others scatter so badly that they cannot use their knowledge at all; while some distorted minds seem to have a faculty for misapplying a large amount of acquired knowledge through complicated processes full of error. To be right, you must be one hundred per cent right. Charity may pardon human nature its percentage of delinquency, but this is a human matter. The laws of nature, mathematics and engineering do not pardon anything. The man may therefore be absolved from censure, but his work must stand the rigid test of inviolable law. Nor is it too much to say that you must be right the first time. Much of our engineering is only done once, and it must be done right that once. A man who has learned by experience to do a thing deserves no credit for doing it right. He is then only a repeating machine. Real power is characterized by ability to perform right the first time that which a man never did before. Such performance involves the power to assimilate and adapt experiences, of more or less like or unlike kind, in a way to bring forth correct results. This is the true use of experience, wherein a man is a thinking, active power, and not a mere repeater.

Clearness of thought is an essential often lacking. This, too, follows from concentration and singleness of purpose. Many minds confuse themselves with a wealth of ideas, grading from the well-formed to hazy, indistinct conceptions. You can clear your mind by proper habits of thought. Train yourself to separate essentials and non-essentials, and confine your consideration to the essentials; to distinguish between what you know and what you only vaguely surmise, clearly eliminating opinion from facts.

Besides what are commonly known as ideas, men have intuitions—sometimes called impressions or opinions which they cannot readily prove. These I believe are identical with reason, except that while reason is composed of a sequence of distinct ideas, each capable of expression, intuitions follow from the capacity of the human mind to integrate small ideas and impressions, each of which is too small to stand alone, or to be readily expressed, but which integrated form a concrete mental impression, called an intuition, and which is of exactly the same character as reason, except that it is composed of smaller and almost intangible units. Do not, therefore, discard intuitions as inferior to reason. Analysis will sometimes develop intuition into an expressible logical thought.

A point of view is involved in the power to rationalize. This again is a thing which each man does for himself in his own best way, and its essence consists in asking one's self whether the thing is reasonable. It is a great check upon error. It applies equally to nearly everything of which engineering is composed. It is the power of the human mind, after performing in more or less systematic and conventional ways, to stand off and look at results and ask one's self whether they are reasonable. One man will figure that certain material weighs two hundred tons, and believe it. Another will say that there is something wrong in that, for it all came on two cars.

Every young man comes sooner or later upon a dilemma, in which he is more or less drawn in opposite directions by his confidence on the one hand and timidity on the other; a desire to perform, backed by the courage of his convictions, but on the other hand resisted by his inability to see his way through in orderly progression to a desired end. This is about the time to show your nerve. Don't be dazed and baffled, but make a start. Use your wits and you will get somewhere, and if you cannot always see the end it will constantly get nearer and plainer when you go as far as you can see and then see how far you can go.

Another point of view concerns engineering expression. This may be through designs, drawings, mathematical determinations, or words, and finally by work done. The lamest of these is words. All engineering is so non-literary in character that the use of language is too much neglected, leading to expressions that do not properly convey thought. In engineering, it is not rhetoric but diction that makes expression clear, and diction is best learned from the dictionary. It is well for a young engineer to cultivate his vocabulary, and learn to use words in their right sense. They are then usually understood, even by those who have less knowledge. A word of caution, however, against assuming that a lack of facility of expression can cloak an absence of knowing what you think. Engineering documents, specifications and letters are full of misstatements due to the careless use of language. Conciseness cannot be over-estimated. Brevity is desirable, but not at the expense of clearness.

One of the worst attributes in engineering, and which is fundamentally born of conceit, tends to fasten error, censure and responsibility on others. There are times when a man needs to stand himself up in front of himself and ask: What is the matter with me? The capacity of any man to admit his own error and frailty of judgment is a measure of strength rather than weakness.

Each of you probably has a preconceived notion of following some line of engineering. Be careful about your self-analysis. The field is large, and has room for all of the various types of men, some of whom incline to constructive operations, others toward inventive, some to the contemplative. Again, within all these divisions, some tend toward professional and others trade work. No one can advise what is best for you. This you must find out for yourself. I cannot help, however, a certain predilection in favor of a young man being just an engineer, and not any particular kind of an engineer—not specializing while too young, but developing along versatile lines, ready to turn his hand equally well to any task within his general scope. All that you receive is only a certain quantity of knowledge, acquired by education, experience, or other training, which will have a certain influence upon what comes out of yourself as your own. It is the inherent capacity to perform with your own brain which will make you what you become, and not the mere transmission of that which you have acquired. Your knowledge, therefore, is of little avail until you make it inherently a part of yourself through mental assimilation and utilization. The clearer you comprehend these things the more readily you can make use of them as against the process of mere acquirement, with a vague motive that in some way or other what you acquire may be of benefit, or that environment will be the force that makes your talent effective. Some have gone through experience without acquiring it, and many a man who has received an education has not got any experience, because he allowed it to be a thing apart from his personality, and it slipped away.

THE NEW POTASH-SALT AGREEMENT.—It is learned that the German Kali Syndicate has decided to lower the prices of certain of its products in order to compete better with the independent plants. The syndicate, embracing 27 works, recently signed a new agreement for five years from January 1, 1905, to December 31, 1909. Thus 30 years will mark the successful operation of a plan to rehabilitate an important industry by energetic propaganda to increase the consumption, and by regulating the output to maintain remunerative prices. The new compact divides the products into five groups, as follows: (1) Chlorine products containing more than 42 per cent potassium, and the so-called 38 per cent calcined potash manure. (2) Sulphate products containing more than 21.5 per cent of potassium. (3) Products of 42.20 per cent potassium, inclusive of 38 per cent potash manure, and the sulphate products of Group 2. (4) Non-carnallite crude potassium salts containing 19.9 to 12.4 per cent of potassium. (5) Potassium salts, including kieserite (native sulphate of magnesia and from the Stassfurt salt mines). Rebates to be allowed are 3 per cent on purchases up to 500 car-loads per annum; 4 per cent up to 1,000; 5 per cent up to 2,500, and 6 per cent over 2,500 car-loads. Agricultural unions are privileged to combine their orders to be benefited by the larger rebates, but merchants cannot do so, nor are they permitted to sell to agricultural unions. The syndicate allows the German Agricultural Society a special discount of 10 per cent, also $12,500 for advertising expenses and a special grant of $25,000 per annum. Thus this society receives allowances of $137,500, equivalent to 11 per cent on a turnover of $1,250,000 per annum, while merchants get only $75,000, or 6 per cent on the same amount. Explanation for the favor shown to agricultural interests is that the Prussian and Anhalt governments control two of the largest works in the syndicate. The proposition made some time ago that £250,000 be created as a 'competition fund' by the syndicate has been voted down by the younger works, but it is intimated that the seniors will act independently on this suggestion, having faith in its efficacy.

COPPER MINES OF LAKE SUPERIOR.—IV.

By T. A. RICKARD.

It is believed by many people usually well informed that in the mines of the Lake Superior region there are bodies of metallic copper so large that it has been found impracticable to extract them. I remember being told seriously seven years ago that in the Michipicoten district, on the north shore, there were rich copper lodes that were not profitable because the metal occurred in masses so huge that they could not be mined successfully. Similar statements appear frequently in popular accounts of the copper country. But recent investigation of this interesting matter enables me now to dissipate a fallacy which has retained a curiously sustained vitality since the days of Alexander Henry and Douglass Houghton.

CUTTING A MASS

The white men who first crossed the lake and penetrated the forests of the peninsula found evidence of earlier attempts to extract the copper; the Indians, and there are those who say that a vanished race of higher capacities, worked the metal that outcropped massively at many localities. Testimony to their effort is shown by the battered fragments of copper dug out of old abandoned workings. Such is the one illustrated in the accompanying photograph; this weighed three tons and it was taken from a pit 16.5 ft. deep at McCargo Cove, on Isle Royale. It exhibits the marks of stone hammers or hatchets; there is good reason to suppose that the Indians built fires around the masses of copper which were too large to be removed, and, after loosening the adhering rock through the effect of the fire, they cut off portions with their hatchets by pounding the copper into waves, as shown in the illustration, until it was finally forced apart in small fragments. Furthermore, the reports of the early *voyageurs* made mention of the celebrated 'copper rock,' an immense boulder of metal found on the right bank of the Ontonagon river; it was visited by the first explorers and travelers. who testified that there was nothing like it anywhere in the world. This mass weighed about four tons; it appeared to be out of place, and may have been moved thus far by the Indians from the outcrop of the Minesota* lode, a distance of two miles only. It was floated down the river on a raft by James K. Paul in 1843 to the village of Ontonagon, to be seized subsequently by the United States Government and shipped to Washington, where it can now be seen at the Smithsonian Institution. This may be said to have been the beginning of the tradition. The experience of the first mining operations added to it, as the notes which follow will explain.

The large bodies of metallic copper found in the lodes of Lake Superior are known as 'mass.' The mines which first established the fame of this region, such as the Cliff, Phoenix, Central, Minesota and National, were all characterized by the occurrence of 'mass.' These chunks of copper were found near the surface, and for years they continued to be encountered underground in great quantity. Such mines required but little capital; they needed chiefly the labor of cutting the metal and of hoisting it to daylight. 'Mass mining,' therefore, characterized the early days. Had the Calumet & Hecla, which has always yielded a strictly stamp-mill product, been discovered in the first decade of development, it probably would have been a failure. The discovery of the Calumet conglomerate came when the rudiments of milling had been learned and when the 'mass' mines were approaching exhaustion.

Two-thirds of the output of the Cliff mine was in the form of masses; some of them yielded from 100 to 150 tons, and as late as 1875 one of 40 tons was taken out.[1] These irregular bodies of metal require special mining methods, for it is impossible to drill into them or use picks in the ordinary way. Professor Blake has described the usual practice in words that I cannot improve: "The miner picks out or excavates a passage or chamber upon one side of the mass, laying it bare as far as possible over its whole surface. It is usually firmly held by its close union with the vein-stuff, or by its irregular projections above, below and at the end. If it cannot be dislodged by levers, the excavation of a chamber is commenced behind the mass, and this excavation is made large enough to receive from 5 to 20 or more kegs of powder. Bags of sand are used for tamping, and the drift is closed up by a barricade of refuse and loose dirt." Reference is made to this method in the description of the efforts made to extricate the great mass found in the Minesota.

MASS FOUND IN ANCIENT WORKINGS.

The Minesota mine, in the Ontonagon dis-

* The name of the mine was spelled Minesota, although the State is named Minnesota.

[1] W. P. Blake, *Transactions* of the American Institute Mining Engineers, Vol. IV, p. 110

trict, was celebrated for large masses. The largest was found in 1857; its greatest length was 46 ft., its greatest breadth 18.5 ft., and its greatest thickness 8.5 ft. The main width was 12.5 ft., and the main thickness 4 ft. Twenty men worked 15 months to remove it from the rock; some of the cuts had a face of 16 sq. ft., and the cutting up yielded 27 tons of copper chips. The weight was estimated at 500 tons,[2] but I shall have more to say about this directly.

The circumstances of this work are told graphically by Geo. D. Emerson, whose statement is quoted in 'The Mineral Statistics of Michigan' for the year 1880. "They uncovered a series of masses with an eastward inclination for the length of 70 or 80 ft., and going out of sight both above and below. It was at once apparent that they had something very valuable, but they had no conception of the immense thing which a few days' work disclosed. At one convenient point they broke away behind the copper so as to get in a sand blast of five or six kegs of powder. They stripped the mass further, and again fired without result. Again they fired nine kegs of powder, and the mass remained unmoved. Breaking the rock around for a considerable distance, 18 kegs of powder were shot off without effect, and again 22 kegs, and the copper entirely undisturbed at any point. After further clearing, 25 kegs were shot off under the copper, and it was thought with some effect. But a final blast of 30 kegs, or 750 lb., was securely tamped beneath the mass and fired. As soon as the smoke cleared away a mass of copper 45 ft. long and 3 to 5 ft. in thickness, apparently very pure, and which will probably weigh 300 tons, had been shot out and was ready for cutting up. The blast had torn the immense body from its bed without exhibiting a sign of breaking or bending in any place, so great was its thickness and strength. It was torn off from other masses, which still remain in the solid rock."

They had exploded 110 kegs, or 2,750 lb. powder! One might remark that had the copper proved less resisting to the violent efforts of these miners it would not have possessed the value in art and industry which we accord to it. The tenacity of the metal, as recognized by these workers underground, may have hindered its easy partition, but it certainly is one of the qualities for which it commands a price when it reaches the surface. However, the mass whose removal is told so well in the above quotation was undoubtedly the largest single body of metallic copper ever mined. Its weight has been variously stated in many reports as having been 500, 530 or 585 tons. Quite recently, however, certain papers covering the business of the Minesota mine were found by Mr. Samuel Brady, the manager of the Michigan mine, which is the successor of the old Minesota, and the data therein contained prove that the celebrated mass weighed 420 tons.[3] These bodies of copper are extremely irregular in thickness; they are ragged in form and straggle through the lode until they nearly connect with other monstrous nuggets. Such was the character of the series of masses encountered in the Bay State mine, now the Phoenix, forty years ago. These aggregated some 600 tons, but they were bodies, none of which singly exceeded 200 tons, connected by strings of metal. Therefore, the fact remains that 420 tons is the largest single mass of native copper recorded in the history of mining.

The practice then, and now, has been to cut the mass with cape chisels having a ¾-in. bit, the successive chips being about ⅛ in. thick. The narrow strips obtained from this operation, when made by skillful operators, and in the absence of any flaw or included rock along the course of the chisel, were taken in one cut through the entire 'mass.' The earlier method was to carry the chip about ⅛ in. thick, as stated, and of equal thickness on both sides, but later this was changed to a more rapid way, the chips thinning to an edge and alternating, as is usual with a cutting made by a chisel of this kind, the process being similar to the driving of a key-way. The narrow strips obtained from this operation are only about half the length of the groove which yielded them, because the metal becomes pressed together and thickened by the blows of the cutters. Certain men made a specialty of this work and became expert, so as to cut a square foot of surface per shift; this meant that one man held the chisel and guided it along the line of cut, while two others struck the chisel alternately with sledge hammers. The cost averaged $12 to $14 per sq. ft. Nowadays, when the cutters are not often needed and special skill is not available, the cost (when done by hand) is greater. At the Michigan mine the pneumatic hammer has been used recently for cutting mass and with success. Mr. Brady informs me that the actual cost of cutting two masses in this mine during the current year was $3.15 per sq. ft., exclusive of power. The cost of cutting the 420-ton mass, previously described, appears, according to a letter of Capt. William Harris, bearing date of October 3, 1865, to have been $12 per square foot.

At the Quincy some masses have been found in recent years, but no big ones. Five or six tons is the limit for convenient handling, but, of course, this will depend largely upon the shape of the mass. Bigger bodies are cut so as to yield pieces suitable for tramming and hoisting. The time taken in the cutting depends upon the shape; sometimes a narrow neck connects two outlying portions, in which case the division is facilitated. The accompanying photograph illustrates the cutting of a mass weighing six tons.

It will be obvious that masses of portable size are less expensive to extract than the very big ones, or, to put it in another way, six lumps of 5 tons each and needing no cutting will yield more profit than one of 30 tons, which may require to be cut into five or six portions. It is said that the great mass of the Minesota mine did not leave much of a margin for profit, for this reason, and it is obvious from the description already given that a good deal of vain effort was expended in extricating that elephantine chunk, but the wages of even the 20 men mentioned, who worked 15 months to remove it, would aggregate only $18,000 at the most, and against this there would be the 420 tons of copper; this would yield about 79 per cent refined copper, or 324.17 tons, which, at $400 per ton, net cash on delivery, after deducting cost of transport, conversion and sale, would yield a total of $129,668,[4] so that the mining cost represents only 14 per cent of the value realized. As a matter of fact, the chips obtained in cutting are usually enough to pay for the cost of the operation. The 27 tons of chips taken from the Minesota mass were worth, under the conditions and prices of 1857, not less than $8,500, and it is certain that the cost of extracting this particular mass was extraordinary, on account of its size and the difficulty of getting it out of the lode. It can be asserted confidently that no one in the Lake Superior country is afraid to encounter mass copper for fear it should prove unprofitable!

Incidentally, it will be interesting to refer to the occurrence of native silver. The largest piece of pure silver found within the last few years was in the Mass mine, and it weighed 12 lb. This piece is now part of the Michigan mineral exhibit at St. Louis. In 1873 a small boy, while 'cobbing' or selecting bits of copper rock in the dump of the National mine, at Rockland, broke, from a piece of conglomerate, a lump weighing 16 lb. Capt. J. C. Thomas, now at the Michigan mine, and formerly at the Cliff, states that he has seen pieces of practically pure metal weighing from 25 to 30 lb. taken from the Cliff mine, as much as $500 worth being extracted in a single night by the men, who presumably did not report the fact to the office. Many thousand dollars have been taken from the mines of Lake Superior in the form of silver secreted by workmen, not to mention the specimens which now enrich museums all over the world.

AN OLD GAS-ENGINE.—The London *Engineer*, of recent date, says: "Most engineers will be surprised to learn that the gas-engine dates back to the year 1820, when an internal combustion motor was shown in operation at Cambridge. According to a letter to *Nature*, by Mr. F. J. Jervis-Smith, of Trinity College, Oxford, it was the invention of the Rev. W. Cecil, Fellow of Magdalen College, Cambridge. A full account of his engine is given in Vol. I, page 217, of the *Proceedings* of the Philosophical Society of Cambridge—paper read November 27, 1820. A new form of parallel motion is described, and what the author calls 'ardent spirit' and turpentine and vapor of oil are suggested as possible substitutes for the gas employed by the inventor of the engine."

TEST OF A 15-HORSEPOWER STEAM TURBINE.—At a meeting of the Scranton Engineers' Club recently Mr. W. E. Barrett read a paper, in which he gave some figures of a test of a 15-h.p. De Laval steam turbine directly connected to a No. 6 Sturtevant blower. The figures are of some interest from their showing the suitability of the turbine for driving blowers under certain conditions. Steam was furnished by a Farquahar return tubular boiler, and the turbine had but one nozzle. The results of the tests are given as follows: Duration of test, 7.5 hours; steam pressure at inlet of turbine, 98 lb.; steam pressure at exhaust, 0.5 lb.; speed when blowing, 22,200 revolutions per minute; blast pressure at outlet of blower, 13.6 in. water; boiler evaporation, 8.43 lb. water per lb. combustible; total water per hour blowing, 601 lb.; cost of water, 20c. per 1,000 gal.; total cost of water per hour blowing, 0.14c.; cost of water per horse-power hour, 0.0012c.; total cost of fuel per hour, at $2.55 per 2,000 lb., 0.0645c.; cost of fuel per horse-power hour, 0.0054c.; total cost of fuel and water per hour, 0.0785c.; cost of fuel and water per horse-power hour, 0.0065c.; fuel used, 9.6 lb. per horse-power hour.

[2] 'Mineral Statistics of Michigan,' 1880, p. 76.

[3] This information is contained in a letter dated October 3, 1865, addressed by Capt. William Harris, manager of the mine, to the secretary of the company .S M. Pond.

[4] In making this estimate I am guided by the report of the National Mining Company, the neighbor of the Minesota, published in *The Mining Magazine*, December, 1857.

THE TRANSVAAL MINES.*

BY J. H. CURLE.

One aspect of the Rand goldfields would be difficult to exaggerate—that is, the immense amount of gold proved to exist, and of such a value as to at least pay for the cost of winning. I am on the safe side in saying that the banket beds of the Transvaal will, from first to last, yield one thousand million sterling, and the Rand's share in this promises to be nine pounds in every ten.

Many of the older gold-producing countries—the United States, Canada, South America, New Zealand, Queensland, India—show to-day either an actual falling off in output, or a lack of new discoveries to take the place of their many big mines, which are gradually being worked out. Were it not for the Rand, the gold yield of the world, which this year will reach seventy millions sterling—the high-water mark of production—would show a steady decline. The increasing yield from Johannesburg, however, will not only balance the deficit elsewhere, but will insure a steady increase of the world's aggregate production for a number of years to come. I have said before, and repeat now, that lack of labor only prevents the Rand's yearly yield—at present fifteen millions—from jumping up to thirty millions in a relatively short space of time.

With such a gigantic asset assured to it, the Rand mining industry cannot help becoming, for the next generation at least, one of the biggest and most important industries in the world. I am not a seer nor a statesman, only a miner. I do not profess to know what will happen to the Transvaal when its banket beds are worked out, whether its soil is rich enough to support a big population, or whether it is advisable to encourage too many white people to make this country their permanent home; but I do know that during the next 20 or 30 years there is going to be a huge output of gold, and this country is going to hum. Such a great and active industry must make demands on the commerce of the world, and if we British cannot make a great big profit out of this industry, quite irrespective of the buying or selling of shares, it will be our own fault.

That is one aspect of the Transvaal mines. Under that heading I should like to discuss at length all the schemes of all the clever men at the head of the industry—schemes which take a big, statesmanlike view of the great economic questions at issue; schemes for cutting down working costs to unheard-of figures; schemes for the erection of 500 and 1,000-stamp units, and for rushing out the ore with the greatest speed possible. I shall hope to deal with this aspect of the industry in due course, and look for great changes and improvements under this head; but I suppose that most readers would first prefer to hear about the financial rather than the technical side of the question.

If, then, I am to express a definite opinion about the values of the Rand mines, I must say, without ambiguity of language, that my ideas have not been materially altered, and that I find most of the mines standing at their full valuation. Although the banket beds may contain in the aggregate hundreds of millions of tons of ore, and produce a thousand millions sterling, that will not prevent the A or the B mine, with its 30 or 50 claims, being worked out in a few years, and thereafter ceasing to have any value. The best dividend-paying Rand mines to-day are the safest mines in the world, but, on the known facts about them, they are standing at their full value. Compared with the best mines in West Australia or North America, they are, at their respective prices, not such good purchases. I hope to do the Rand the fullest justice, and to make every allowance for future improvements in local conditions, but it is only right to tell the reader that he can invest his money to equal advantage in gold mines that are outside South Africa altogether.

But there is still another phase of the situation, and that, I hope, may carry consolation to my many friends in South Africa. The Kaffir market has never been swayed by logic, and, for all I know to the contrary, it never will be. The speculator reasons that, though his shares, on known data, may be high enough, yet they are supported by one or other of the big financial interests, and that, with very little encouragement, these people, backed by the big mass of sentiment, which is only lying dormant at present, could raise prices materially all round. Well, it seems to me that the material for a rise in the market is already to hand, and that the sentiment, which has always supported these shares, will shortly spring again into being. I will give my reasons for thinking this. So far as I can see, the Chinese labor experiment is a definite success. There are at the moment of writing 9,000 Chinese here, and I think it is possible that by, say, April, 1905, there will be 40,000 here altogether. This amount of labor, added to that already on the field, will add materially to the output of gold. I expect that the September output will begin to show an improvement, which will continue each month, and it is not unreasonable to expect that in the first half of 1905 the record figures of 1899 will be reached and passed. The cautious, logical man will tell you—and he would be quite right—that, at present prices, all this is really discounted; but then, in mining speculation, the logical man is often brushed rudely aside, while good, healthy optimism has its innings. And so I believe that, with the Chinese a success, with a rapidly increasing output, and with no untoward complications in the Far East, the optimist will once more come to the front, and Kaffir shares will go up. A time will come when people must turn their attention to the serious financial and economic questions which loom ahead. In this article I shall not lay undue stress on these slightly remote matters, but draw your attention rather to the thousand millions lying in the ground, to the improving labor supply, to the definite lowering of costs, which will follow as a natural sequence, and to the increasing output of gold.

* From *The Economist*, London, October 22.

COAL MINING MACHINERY IN GREAT BRITAIN.—The British 'General Report on Mines and Quarries' shows that in 1903 there were 225 collieries where coal-cutting machines were at work. The total number of machines employed was 643, of which 231 were worked by electricity and 412 by compressed air; the total quantity of coal obtained in 1903 by the aid of these machines was 5,245,578 tons—this is an increase of 1,084,376 tons compared with 1902, and 2,201,257 tons compared with 1901. The Yorkshire & Lincolnshire district takes the lead as regards the number of machines employed, next comes the Midland district. In South Wales and in the Southern district the use of machines is very rare. The disk type finds most favor, 483 of the machines in use being of that class.

THE TIME-SWING OF BALANCES.

BY CHAS. S. PALMER.

There are some points about the behavior of balances which are of vital importance, and wherein they may be improved, not only in the service of the practical chemist and analyst, but also in the use of the teacher and theorist—for much of the weighing of the research chemist could be done in a manner to save him valuable time.

The manufacture of balances has been brought to a perfection that formerly was not dreamed of, notwithstanding that the old Scriptures speak of the "fine dust of the balance." Advertisements of various dealers speak of the construction, the load, the sensibility, and of all the various accessories that go to make the mechanism and working perfect and complete; but, with one accord, they all neglect what ought to be one of the chiefest virtues of any commercial balance, whether analytical or assaying. The point overlooked is the matter of the time-swing; and it is a matter of more importance than the ignoring of it by the catalogues would indicate.

I had occasion recently to order and pass upon the merits of several balances of the best western and eastern houses, and found myself forced to go back to first principles, and ask myself the question, what are the essential points of a good commercial balance?

Evidently the answer to this question would include: (1) construction, including strength and durability, (2) sensibility, (3) load, and (4) speed or quickness. But this last point is invariably ignored—at least in any way which will enable the purchaser to judge of the real merits of the instrument.

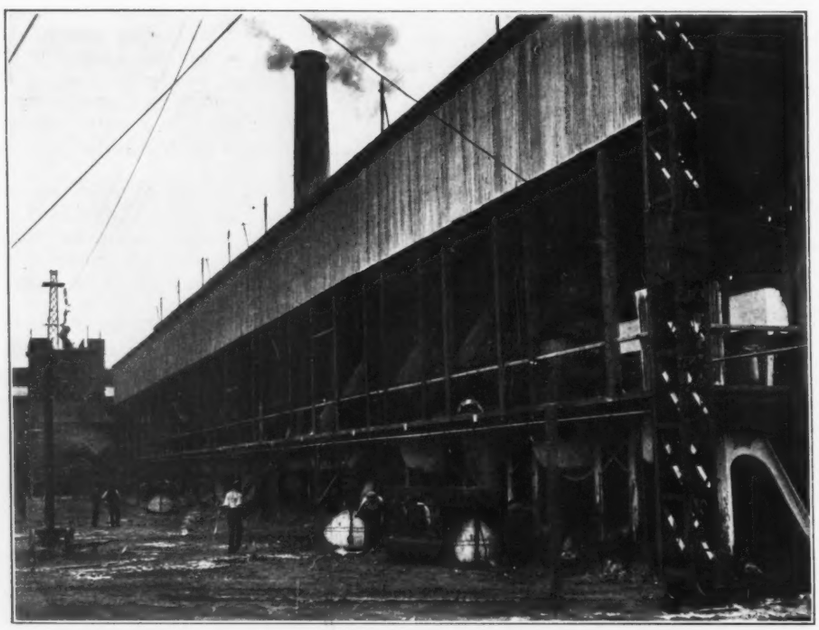
A few observations on some six or eight balances of various makers gave me some valuable information; and along lines which seemed to have been overlooked by some of the men of longest experience. Thus I found that the ordinary good balance would make one complete swing—from right to left, and back again to right—in about 15 seconds, though most were three seconds slower than this. A new balance, finely constructed, and made by one of the oldest balance-makers of the west, in response to a special request for a "quick balance," took the record for slowness, using 28 seconds to make the full swing. The shortest-swing balance that we found was an old aluminum-plated instrument of Becker's. This looked to be in woful condition—having been through one or two explosions; but it was showing a very good sensitiveness, and doing it in 11 seconds for one complete swing.

It would be interesting to know what the balance-makers could do if they advertised the time-swing of all their better instruments. My own belief is that a good 10-second balance is easily within the reach of modern mechanism; and this both for analytical work, in weighing in and weighing out, and not only for pulp balances, but also for the finest scales for silver and gold work. The only thing necessary is for all workers to unite in calling the attention of the makers to advertising this point of time-swing, together with the maintenance of all the other good qualities of their balances. For the rest, the matter of natural competition will take care of itself; for the improvements in construction seem to point out the way to the sure and quick accomplishment of this indispensable requisite for the saving of time. It is to be hoped that this may be done in the near future.

THE BRADFORD-CARMICHAEL PROCESS.

By DONALD CLARK.

Subsequent to the introduction of the Huntington-Heberlein process in Australia, Messrs. Carmichael and Bradford, two employees of the Broken Hill Proprietary Company, patented a process which bears their name. Instead of starting with lime, or limestone and galena, as in the Huntington-Heberlein process, they discovered that if sulphate of lime is mixed with galena and the temperature raised, on blowing a current of air through the mixture the temperature rises and the mass is desulphurized. The process would thus appear to be a corollary of the original one, and the reactions in the converter are identical. Owing to the success of the acid processes in separating zinc sulphide from the tailing at Broken Hill, it became necessary to manufacture sulphuric acid locally in large quantity. The Bradford-Carmichael process has been started for the purpose of generating the sulphur dioxide necessary, and is of much interest as showing how gases rich enough in SO_2 may be produced from a mixture containing only from 13 to 16 per cent sulphur.



CONVERTING PLANT.

Gypsum is obtained in a friable state within about five miles from the hill. This is dehydrated, the $CaSO_4 2H_2O$ being converted into $CaSO_4$ on heating to about 200° C. The powdered residue is mixed with slime produced in the milling operations and concentrate in the proportion of slime 3 parts, concentrate 1 part, and lime sulphate 1 part. The proportions may vary to some extent, but the sulphur contents run from 13 to 16 or 17 per cent. The average composition of the ingredients would be:

	Slime.	Concentrate.	Cal cium Sulphate.	Average.
Galena	24	70	..	29
Blende	30	15	..	21
Pyrite	3	..	..	2
Ferric oxide	4	..	..	2.5
Ferrous oxide	1	..	..	1
Manganous oxide	6.5	..	..	5
Alumina	5.5	..	..	3
Lime	3.5	..	41	10
Silica	23	..	..	14
Sulphur trioxide	..	..	59	12

The whole of these materials are moistened with water and well mixed by passing them through a pug mill. The small amount of water used serves to set the product, the lime sulphate partly becoming plaster of paris, $2CaSO_4 H_2O$. While still moist the mixture is broken into pieces not exceeding two inches in diameter and spread out on a drying floor, where excess of moisture is evaporated owing to the conjoint action of sun and wind.

The pots used are small conical cast iron ones, hung on trunnions, and of the same pattern as used in the Huntington-Heberlein process. Three of these are set in line, and two are at work while the third is being filled. These pots have the same form of conical cover leading to a telescopic tube and all are connected to the same horizontal pipe leading to the niter pots. Dampers are provided in each case. A small amount of coal or fuel is fed into the pots and ignited by a gentle blast; as soon as a temperature of about 400° to 500° C. is attained the dried mixture is fed in, until the pot is full; the cover is closed down and the mass warms up. Water is first driven off, but after a short time concentrated fumes of sulphur dioxide are evolved. The amount of this gas may be as much as 14 per cent, but its volume is kept at about 10 per cent. so as to have enough oxygen for the conversion of the dioxide to the trioxide. The gases are led over a couple of niter pots and thence to the usual type of leaden chamber having a capacity of 40,000 cu. ft.; this is in communication with the old smelter stack. Chamber acid alone is made since this requires to be diluted for what is known as the salt-cake process.

It is proposed to duplicate this plant and to add the usual Gay Lussac and Glover towers. The plant has now been in operation for some time and, it is claimed, with highly successful results. The product tipped out of the converter is similar to that obtained in the Huntington-Heberlein process, and is at once fit for the smelters, the amount of sulphur left in is always less than that originally introduced with the gypsum; usually from 3 to 4 per cent.

The success of the acidulated solution processes and the manufacture of sulphuric acid by this means have opened up a new source of wealth for Broken Hill. Mr. G. D. Delprat, the general manager of the Proprietary mine, recently stated that ore containing 200,000 tons of zinc, more than one-third of the world's supply, was raised annually at Broken Hill. Regular shipments are being sent away at present, but it is considered that the whole of the ore and some millions of tons of tailing which have accumulated will be treated for their zinc content. In addition to this the company proposes to erect large sulphuric acid works at Port Pirie, and to manufacture superphosphates from the extensive phosphate beds in Yorke Peninsula, South Australia. Curiously enough, the Mt. Lyell Company has almost simultaneously announced that it will erect similar works in Melbourne for the same purpose; in the latter case the acid will be produced from the low-grade pyritic ore.

COKE-OVEN GAS AND TAR AS FUEL.—According to the London *Engineer*, an attempt to use coke-oven gas (from Otto Hoffmann retort-ovens) as sole fuel for open-hearth furnaces resulted in failure; but by using, in addition, a certain amount of coke-oven tar, delivered to the burner in the furnace through a steam-heated main, there was no difficulty in maintaining the desired temperature in the furnace. The tar also gave satisfactory results when used alone as fuel. For the production of 1 ton of steel, 17,127 cubic feet of coke-oven gas of 550 British thermal units per cubic foot, and 584 lb. of tar (15,781 British thermal units per pound 'solid'), were required; whilst when producer-gas was employed, 1,076 lb. of coal (12,500 British thermal units per pound) were needed. The sulphur introduced into the process by the fuel (1,076 lb. of coal) amounted to 22.596 lb. when producer-gas was used, and 13.693 lb. when the fuel consisted of coke-oven gas and tar (17,127 cubic feet of gas and 584 lb. of tar). If tar alone had been used, only 4.88 lb. of sulphur would have been introduced. In 1896 Mr. J. H. Darby, of Brymbo, communicated to the Iron and Steel Institute his experience with Mond gas for making steel in a 3-ton furnace, measuring 12 ft. between the blocks, erected for experimental purposes at Winnington. The effectiveness of the gas was ascertained, but the quantity consumed was not definitely measured. Mr. Darby at the same time pointed out that the presence of tarry matter in gas had been found to be an advantage at the works of the Coltness Iron Company, where unwashed blast-furnace gas had been found effective for steel-production, whilst gas washed for its ammonia had to be abandoned. The exact reduction in the hydrocarbon constituents of the gas caused by the washing was not stated; but the improved quality of a gas containing tarry (hydrocarbon) vapors after passing through a regenerator, the tar thereby becoming fixed, was clearly shown by the analyses. They showed a rise of hydrogen and of carbonic oxide at the expense of carbon dioxide, and with a diminution from 53.8 to 48.98 in the percentage of nitrogen by volume. Considering the well-known high heating value of tar, it is evident that a considerable margin remains for improvement in the working results recorded by Mr. D. Baker.

THE CHEMISTRY AND METALLURGY OF COPPER.—II.

By Chas. S. Palmer.

The distinction between physical and chemical properties is by no means easy to define, if one must follow the refinements of meaning of all the indefinite compounds, such as alloys, mixtures of compounds and the like; but the distinction is clear for all practical purposes. By physical property is meant that kind of property which any particular substance shows to any of the senses directly or by means of a measuring instrument. Thus the common physical properties include the color, form, specific gravity, hardness, malleability, ductility, taste, electric conductivity, magnetic action, action on static electricity, transparency or opacity, plain solubility (where it can be recovered from solution unchanged by simple evaporation), smell, etc.

By the chemical property is meant the general tendency to form certain compounds, which in turn may be stable or may tend to form yet other compounds, and each of these compounds has its own special and characteristic physical properties. To illustrate, the physical properties of copper include its red color, its specific gravity of about 8.93, its toughness, ductility and malleability, its electric and heat conductivity. The chemical properties of copper include its occurrence in the native form as well as a sulphide, oxide, carbonate, etc.; the ready reducibility of these sulphides, oxides and carbonates to the free state; the comparative stability in resisting ordinary corrosion of air and water, and in contrast, the ready yielding of the metal to the action of the acids, especially nitric acid, the tendency being to form a series of compounds soluble in water, and so on.

It will be noticed that physical property is emphasized by permanence in the action on the senses; while chemical property is characterized by *change*, in the transition from one compound to another, with the implied comparison of the physical properties of each. This has been almost unduly magnified by the new physical chemistry, which regards the chemist's compound as only a 'phase' of union and decomposition. The stability of all compounds is undermined by varying the physical condition. Hence the attention is liable to be directed to the relative stability of the compound or 'phase,' rather than to the 'phase' itself. The mental view must include both the 'phase' and its relation to other 'phases' in the control and readjustment of physical conditions.

We feel the need of a wider basis of comparison for the right use of the physical properties as well as the chemical. Fortunately, the basis for a grand comparison of the elements is now available. It is high time that the attention of all careful students should be directed to this basis; it has been called the 'Periodic Law'; but it had better be called by the more cautious name of the Periodic Sequence; for while there may be and doubtless is a law at the bottom of this wonderful natural arrangement, it is too soon yet to formulate a law; it is safer to call it simply a sequence. The most generalized arrangement of this sequence is found in Table I.

For convenience, I will call the relative place of any element in this classification the 'locus' of the element in question. It will be noticed that, after hydrogen—which is in a series all by itself—there are two short series of seven elements each, each series beginning with an alkali and ending with a halogen; that these are followed by two long series, each of which likewise begins with an alkali element and ends with a halogen; that the first of these long series has seventeen elements, and the second has sixteen, which, with the presumably missing element provisionally called 'eka-manganese,' would also count seventeen. There are fragments of three other series, but they are far from being complete, though some of them show elements fairly well known. The short series count up their seven without break, from lithium to fluorine, and from sodium to chlorine, respectively. In the long series there is regularity in counting from potassium to manganese, and from copper to bromine; and similarly from rubidium to eka-manganese, and from silver to iodine. But in these last two series there is found in each an intermediate group, the 'eighth' of the older nomenclature. That this group, or these groups, for there are three of them, are not separate parts of the long series, but only exquisitely adjusted middle portions, is proved by this wonderful fact, namely, that the atomic volumes of any series, long or short, are largest at the ends, and grade down from the alkali end to the middle at the series minimum, and then grade up again to large volumes at the halogen end. This is a law of the arrangement, as any one can prove by a little study and calculation. Now, the middle parts of the long series, such as the iron-cobalt-nickel, or the ruthenium-rhodium-palladium, or the osmium-iridium-platinum, in every case represent respectively the volume minima of their respective series. The part-series are provisionally called endo-serial groups.

Copper belongs to the first long series, just after the iron-cobalt-nickel group, and just above the homologous elements, silver and gold, together with the presumably missing eka-silver and eka-gold. The study of this locus of copper is as instructive as it is fascinating. The eleventh element of the first long series should, by the analogy of position, have a normal valence of one, counting back from bromine seven, selenium six, arsenic five, germanium four, gallium three, zinc two, and copper one, as we find it in the cuprous compounds. At this point it is proper to explain my use of the term valence, lest I should be criticised by the more conservative students of chemical theory. I am familiar with the study of those marvelous and numerous compounds of carbon, which lend themselves both to the molecular weight determination, and also to the structure dissection of chemical reaction; and I have altogether too much respect for the doctrine implied in all this to use carelessly any language or symbolism, either stolen or borrowed illegitimately from another field. When the term 'valence' is used, with the associated terms, monad, dyad, triad, etc., all that should be meant is that a combining unit of a monad metal can replace one part by weight of hydrogen, or can combine with thirty-five parts of chlorine, or with one-half of sixteen parts of oxygen, and so on. These quantitative relations can be traced, for instance, between all the members of the cuprous and the corresponding members of the cupric series. The valence terms and the valence marks are only so many labels of the degree of oxidization, if rightly used. We are hardly justified as yet in following the logic of the valence marks into the molecular structure of most inorganic compounds. This is allowable and even necessary in the chemistry of carbon; but a cool-headed, intellectual sobriety will use the term and the mark and the concept of valence as applied to non-volatile compounds with the greatest caution. I hope and believe that this statement will commend itself to the approval of every cautious student.

Referring to Table I, it will be noticed that the graduated shading of the various physical properties are marvelously distributed, and that the relations of copper to zinc, on the one hand, and to nickel (or cobalt) on the other, resemble the similar relations of silver to cadmium, on the one hand, and to palladium on the other. Unfortunately, the time has not yet come when more than a small part of the physical and chemical properties can be foretold from the particular locus of any element; but this remarkable grouping is more than an accident, and it is high time for the practical metallurgist to join hands with the chemist in developing and interpreting the laws that must lie behind the brilliant but partial generalization which is the basis of the Periodic Sequence.

The comparative chemistry of copper is illustrated in part, and is also in part obscured by this periodic sequence. Let us take a general look at the chemistry of copper. Carbon is the only element which is known to us with some fair degree of completeness. If any one doubts this, let him spend a few months on the study of the monumental thesaurus called Beilstein, and on the companion volume, Richter's numerical lexicon, with their eighty-odd thousand enumerated compounds. Let him observe that many thousands of these have had their

THE PERIODIC SEQUENCE.

	I	II									II	III	IV	V	VI	VII	
	H 1.01																He 4
Short Series	Li 7										Be 9.1	B 11	C 12	N 14	O 16	F 19	Ne 20
" "	Na 23	Mg 24										Al 27.1	Si 28.4	P 31	S 32.1	Cl 35.4	Ar 40
Long Series	K 39.1	Ca 40.1	Sc 44 0	Ti 48.1	V 51.4	Cr 52.1	Mn 55	Fe 56	Co 59±	Ni 58.7±	Cu 63.6	Zn 65.4	Ga 70	Ge 72.5	As 75.0	Se 79.2	Br 79.9	Kr 81.8
" "	Rb 85.4	Sr 87.7	Y 89	Zr 90.5	Cb 94	Mo 96	?	Ru 101.7	Rh 103	Pd 106.5	Ag 107.9	Cd 112.3	In 114	Sn 119	Sb 120	Te 127.5±	I 126.8±	Xe 128
"	Cs 132.9	Ba 137.4	La 138.5	Ce 140	Pr-Di 140.4 Neo-Di 143.6	?	?	?	?	?	?	?	?	?	?	?	?	Inactive or Exo-Serial Group.
"	?	?	Yb 173	?	Ta 183	W 184	?	Os 191	Ir 193	Pt 195	Au 197.2	Hg 200	Tl 204.1	Pb 206.9	Bi 208.3	?	?	
"	?	?	?	Th 233	?	U 240	?	?	?	?	?	?	?	?	?	?	?	
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	

Endo-Serial Group.

Having Volatile Alkyl Derivatives

Table I.

molecular weights determined, and from their known reactions show their true relationships. Or if this is too confusing and unremunerative, let the student spend a few months on the special study of some comparatively simple groups, such as methane and ethane and their oxidation products. It is safe to say that the parallel of relationships shown by the hydrocarbon, the alcohol, the aldehyde and the acid of methane and ethane does not exist elsewhere. To one who has once begun to grasp the significance and promise of it all it becomes a matter of difficulty to tear his attention away to other fields of study. Moreover, equally beautiful relations are found in the higher homologues of methane and ethane; or in the oxidation products of other series of hydrocarbons, such as the unsaturated ethylene and acetylene derivatives, or in those of the saturated poly-methylenes; or in the cyclic benzene and benzenoids, and so on to the pyridines, the quinolines—but I pause, this is not the place to overdo the comparison. On the other hand, looking at the chemistry of copper, aside from one volume on the metallurgy of copper, a volume which has won well-deserved honor, there is not a single book of any value in the English language which is devoted exclusively to the chemistry or the metallurgy of this magnificent metal. Dammer, the great German authority, devotes but 142 pages to the metal, counting the 22 pages in the supplementary volume, which appeared in 1902. Now, in this compendium—the best that we have—Dammer enumerates about 450 compounds of copper, with perhaps some forty or more alloys. If to this we add the salts of the copper oxides with the acids found in organic lists, the known copper compounds would probably amount to nearly a thousand. This looks fairly promising. But when one examines these more carefully, for example, asking how many of these compounds of copper can be volatilized without decomposition, it is disappointing to learn that only one or two of the copper compounds can have their molecular weights directly determined by vapor density, though some of them are susceptible to the newer freezing-point or boiling-point methods. Cuprous chloride was the only volatile compound given in the old lists. As shown from the table of the Periodic Sequence, copper is to the left of the line marking the division between the elements having and not having volatile alkyl compounds; and copper is with those not having such volatile compounds with the methyl and ethyl residues.

There are other limitations to learning the chemistry of copper, for example, the fact already mentioned of the insolubility of the cuprous compounds in plain water.

But there is a brighter side to the inquiry; for instance, note the remarkable plausibility of what little theory copper can claim, as in the vapor density of cuprous chloride, the practical identification of the atomic heat, and the relations of the two series of the cuprous and cupric compounds. In addition, I shall emphasize other peculiarities of copper, such as the remarkable and easy oxidizability and reducibility of the metal, either in the wet or dry way, the wonderful series of oxidation products with sulphur as the oxidizer, or the many-sided tendency to the formation of those chemical mixtures called alloys. It becomes apparent that if copper is different from carbon, yet copper has a sufficiently promising field of its own. Indeed, the list of the oxidation products of copper is so great that there is need of some simple system to present them at a glance. An oxidation table is given herewith to aid the reader who would master the main relations.

Reduced Extreme.			Oxidized Extreme.
(CuH ?)	Cu Cu_4O Cu_2O	CuO (Cu_2O_3 ?)	CuO_2,HO
(CuR ?)	CuOH	$Cu(OH)_2$	
Cu_2C_2	Cu_2S	CuS	
	CuCl	$CuSO_4$	
	CuI	$Cu(NO_3)_2$	
	CuCNS	$CuCl_2$	

In this form are given some of the principal compounds, in their order from reduced to oxidized extreme. The 'R' in the first column is the abbreviation for radical or residue, referring to such as methyl, ethyl and other similar hydrocarbon groups, which collectively are called the alkyl residues. The only stages that are of common and practical importance are those of free copper, the cuprous series headed by Cu_2O, and the cupric series headed by CuO.

I shall have more to say regarding the sulphur compounds of the cuprous series. The series is capable of great expansion, almost any salt being capable of being formed, with the constant limitation of their insolubility in plain water. The cuprous compounds which may be most easily made are the red cuprous oxide, as in the well-known sugar test; the cuprous iodide and sulpho-cyanate; and all of these may be made from the cupric salts, the last two directly from cupric sulphate, by reason of the instability of the cupric iodide and sulpho-cyanate, respectively.

The succeeding part of this contribution will consider in detail the thio-compounds of copper, a field where this metal is almost beyond comparison in the number and variety of its oxidation stages with sulphur.

SOME ANTHRACITE STATISTICS.

The very full report of Mr. James E. Roderick, chief of the Department of Mines of Pennsylvania, gives the following statement for the production of anthracite coal in that State in the year 1903; the figures are in long tons:

	Tons.	Per cent.
Coal shipped from mines	60,231,104	89.7
Sold to employees and others at mines	1,230,506	1.8
Used in operating collieries	5,710,341	8.5
Total	67,171,951	100.0

No comparisons with the previous year can be made, owing to the abnormal conditions of production in 1902, resulting from the strike of the miners in that year.

The following averages can be obtained from the tables given in the report:

Average number of days worked	211
Total number of employees at mines	151,827
Average tons mined per employee	442.36
Average tons mined per employee, per day	2.10

Of the total number of employees, 102,055 were employed inside the mines, of whom 36,823 were classed as miners. There were 49,772 persons employed on the surface.

Of the total production given above, 3,677,909 tons, or 5.3 per cent, came from the washeries, in which the coal was washed out, or saved, from old culm-banks.

The number of horses and mules employed in the collieries was 16,872. In mechanical haulage, there were in use 405 steam locomotives, 71 compressed-air locomotives and 84 electric motors. There were in use 4,712 boilers and 4,652 steam-engines of all classes, 81 dynamos and 166 air compressors. There were 820 pumps in use, delivering water to the surface, the total rated capacity being 447,361 gal. water per minute, delivered to surface. There were used in blasting 5,317,422 lb. dynamite and 1,701,176 kegs of powder. This shows an average of 0.025 keg powder and 0.079 lb. dynamite per ton of coal mined.

Mr. Roderick's report says: "The year 1903 was one of remarkable prosperity in the coal industry of Pennsylvania. New records of production were established in both the anthracite and bituminous regions, and for employer and employee alike the period was one of unprecedented success. The production in the anthracite region, with which this part of the report has to deal, amounted to 67,171,951 gross tons. The long and disastrous strike of 1902 had depleted the supply of coal to such an extent that it required full and continuous work at the mines for the first ten months of 1903 to restore the normal conditions of the trade in this country and Canada. During November and December, however, the production was greatly curtailed, owing to a cessation in the demand, and most of the operations closed down completely December 24. Had the same ratio continued throughout the year, the production would have been about 73,000,000 tons. As stated in former reports, it is evident that the high-water mark in the daily production of anthracite coal has been reached, although the annual production may be increased. The number of working days, however, can hardly exceed 250 in a year, as the repairs to the mines, inside and outside, require many weeks, and the loss of several weeks more is caused by various accidents—explosions, flooding and caving-in of mines, and breaking of machinery. Taking 250 as the maximum number of days, and 320,000 tons as the maximum daily production, we find the possible production for a year to be 80,000,000 tons.

"It is also probable that the cost of mining anthracite coal will increase each year, for the reason that the most accessible and most easily worked seams are rapidly being exhausted, necessitating the working of deeper seams, and in many cases much thinner ones. The cost of producing coal from a 2-ft. seam is considerably greater than from a 6 or 8 or 10-ft. seam."

MINE WORKERS IN GREAT BRITAIN.

—The number of persons employed in British mines in 1903 is shown in the following table:

	Mines.	Under ground.	Above ground.	Total.
Coal mines	3,309	666,144	162,824	828,968
Iron mines	124	11,561	3,696	15,257
Other mines	689	16,612	11,052	27,664
Total	4,122	694,317	177,572	871,889

Other mines are those which are worked for metallic ores other than iron, and for minerals commonly designated as non-metallic, such as barytes, gypsum, limestone, oil-shale, rock-salt, sandstone and slate. The total shows an increase of 18,181 over 1902, which was entirely in the coal mines. The proportion of the underground workers to the total number employed, which at coal mines is 80.4 per cent and at iron mines 75.8, drops at other mines to 60. This is due to the number of persons employed in 'dressing' the metallic ores and slate. The proportion of young persons (under 16) employed under ground, which at coal mines is 5.4, falls at iron mines to 2.3, and at other mines to 1.2 per cent. There were 5,323 women employed in coal mines, 15 in iron mines, and 310 in other mines—5,648 women, all above ground.

Ore occurring on parallel lodes at opposite points is termed 'ore against ore.' The French technical equivalent is *vis à vis*.

EVAPORATION OF SOLUTIONS.

In many hydro-metallurgical processes an evaporation of some solution is necessary at a certain stage. Although the operation of evaporation is an extremely simple one, there is not much data to be found in metallurgical literature as to the efficiency of the various kinds of apparatus that may be employed for the process, or as to the best way of performing it.

Evaporation is likely to be expensive unless the waste heat of some other process can be utilized. The evaporative power of 1 lb. of carbon is theoretically about 15 lb. of water, from and at 100° C. With water-tube boilers of the highest type and superior grades of coal, an evaporation of 10 lb. of water per pound of coal is attained in practice, but with inferior coals the ratio is much smaller. In proportioning a steam boiler it is customary to reckon an evaporation of 3 to 4 lb. of water per hour per square foot of heating surface.

With the so-called multiple-effect systems of evaporation the efficiency of the coal can be greatly increased. Thus the Yaryan Company, of New York, states that a good grade of coal which will evaporate 8.5 lb. of water in a well-proportioned boiler, will evaporate 16 lb. in a double-effect apparatus, 23.5 lb. in a triple-effect, 30 lb. in a quadruple-effect and 37 lb. in a quintuple-effect, for each pound of coal burned under such a boiler, after proper allowance for loss by radiation.

The materials of which the multiple-effect evaporating plants are built, however, precludes their use for evaporating corrosive solutions. For the evaporation of such solutions on a large scale special pans are required. These may be lead-lined iron pans, enamelled iron, or naked cast-iron, according to the nature of the solution, the objection to its possible contamination, etc.

The efficiency of directly heated pans varies according to the extent of the heating surface exposed, its arrangement, and the calorific power of the coal employed. With good coal an evaporation of 5 to 6 lb. of water per pound of coal is probably as high a rate as can be expected, unless pans of very great heating surface be installed. In the report of the superintendent of the Onondaga Salt Springs Reservation for 1889, Dr. F. E. Englehardt stated that in evaporating the Syracuse brine in kettles with anthracite smalls burned on perforated grates the ratio of evaporation was 5.53 lb. of water per pound of coal, 40 to 45 bushels of salt being obtained per ton of fuel. In evaporating in pans the production of salt is 70 to 75 bushels per ton of fuel, which would indicate a ratio of evaporation of 9.68:1.

In order to obtain a rapid evaporation it is necessary to raise the temperature of the solution to its boiling point. Below that temperature the formation of vapor takes place only on the surface; in boiling, it takes place within the liquid. The former is a slow, the latter a quick, method of evaporation. Apart from the calorific power of the coal, the governing factor of evaporation is the extent and disposition of the heating surface. Different types of apparatus do not necessarily give different efficiencies. Thus steam boilers of a great variety of types give practically identical economic results, approaching the maximum possible when operating conditions are favorable. In this connection Dr. Charles E. Emery, in a discussion on 'Tubulous Boilers,' said the following:[1]

"The economy of a boiler does not depend upon its type or the particular way the water is circulated, but upon the simple principle that when there is proper circulation of both the water and the products of combustion, the economical result is a function of the average quantity of combustible burned per square foot of heating surface. It is important that there be proper circulation, not only of the water, but also of the products of combustion. Many special boilers have large chambers and curiously shaped passages, so arranged that the products of combustion do not necessarily pass over all portions of the heating surface; the current takes the lines of least resistance, and while the surface actually passed over is very efficient, average efficiency is low. It being settled that the economy of the different types of boiler is based on the same law, the efficiency is frequently very low, which is due generally to the improper distribution of the hot gases over the heating surfaces, whereby a large proportion of the gases can take a short circuit to the stack. This difficulty is easily overcome in ordinary boilers by reducing the cross area for draft, so that the whole heating surface becomes efficient, which can be done if the products of combustion either pass through fire tubes or between water tubes."

The efficiency of a directly heated pan for evaporating water may be theoretically as high as that of a boiler of the most approved design. The conditions of evaporation in a pan are precisely analogous to those of evaporation in the old, simple cylinder boiler, which, as used in the anthracite coal region, is commonly 30 in. in diameter and 30 ft. long, exposing 120 sq. ft. of heating surface, except, of course, that the function of the boiler is not merely to evaporate water, but also to create a pressure above that of the atmosphere. In order to obtain a high ratio of evaporation from pans, however, it is necessary to make them very long, in order that all the available heat of the fire gases may be utilized. Thus, in evaporating brine in the salt district of Kansas, wrought-iron pans 125 ft. long by 25 ft. wide and 12 in. deep are employed, the fireplace being at one end, and the products of combustion being made to pass under the entire length of the pan.

The conditions of evaporation by heating the surface of the liquid are substantially the same as when the heat is applied from beneath, but the heat does not have to be conducted through an intermediate medium, and the volume of gases sweeping over the surface removes the vapor as fast as formed. Surface evaporation is, however, less economical than the other method, because liquids are not so easily heated from above. The hot liquid in contact with the gases expands and has no tendency to cause convection currents, but rather remains stationary above the colder portion. When the boiling of a liquor brings down an insoluble deposit which may coat the bottom of the pan, decreasing its heat conductivity and rendering the pan liable to destruction from overheating, surface evaporation may be advisable or even necessary.

In conducting an evaporation in a pan heated from below, a current of air over the surface of the liquor will not increase the rate of evaporation if the liquor be heated to boiling, but, on the contrary, will tend to diminish it by cooling the vessel containing the liquor. On the other hand, if the liquor be not heated to boiling, the continuous removal of the atmosphere in contact with the liquid is necessary; otherwise, as soon as the atmosphere has become saturated with vapor, evaporation ceases. It is a necessary condition of evaporation at temperatures lower than the boiling point that the atmosphere into which the evaporation takes place be continuously renewed, and it is advisable that the air into which the water evaporates should not be of lower temperature than the liquid.

[1] Journal of the American Society of Naval Engineers, Vol. II, No. 3.

MAGNESITE IN THE UNITED STATES.

In a recent report prepared for the United States Geological Survey, by Mr. Chas. G. Yale, on the production of magnesite, he says that in the United States the entire product of magnesite comes from California. During 1903 the quantity reported was 3,744 short tons crude, valued at $10,595, equivalent to 1,361 tons calcined, worth $20,515.

The production of crude magnesite is practically in the hands of one firm at present. The crude product is sent to the manufacturers of carbonic acid gas for calcination, and the calcined product is used by the paper mills. The demand for both crude and calcined magnesite is limited on the Pacific coast. Owing to a freight rate of $13 to $15 a ton on shipments to eastern points, it is not shipped out of California except to the paper mills in Oregon. The production of California could be quadrupled if the demands of consumption warranted the increase.

The principal producing point in California is in the vicinity of Portersville, Tulare county, though small quantities still come from Chiles valley and Pope valley, Napa county. The most extensive deposit in California is in Placer county, but it is in an almost inaccessible mountain region, where a very costly road would be necessary to get the product out, and the deposit therefore has not been utilized. Near Sanger, Fresno county, is another deposit which is now being opened. A deposit has been discovered also near Walkers Pass, Kern county, but it has never been developed. There are also unutilized deposits near Morgan Hill, Santa Clara county.

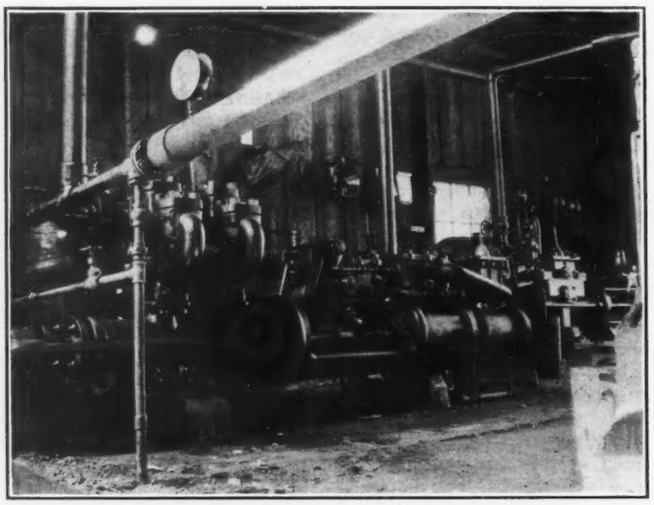
In a recent number of the JOURNAL we gave a full account of the consolidation of a number of magnesite mines in California under the title of the American Magnesite Company, and of plans made for working these deposits more extensively hereafter.

GOLD IN COAL.—In a paper read before the Institution of Civil Engineers, Mr. James Clenhall, describing the Cambria coalfield of Wyoming, mentions the interesting fact that gold and silver are present in small quantities in the coal. From the occurrence of iron pyrite, which is distributed throughout the coal-seam, it is suspected that this mineral carries the precious metals. The coke made from the coal is used in the smelting works at Deadwood, S. D., and averages from one to two pennyweights gold per ton, which is sufficient to compensate for a high ash content. In commenting on the subject the *Australian Mining Standard* calls attention to a similar occurrence in South Africa, described by Mr. Francis B. Stephens, at one time assayer for the Buffelsdoorn Estates & Gold Mining Company. The coal occurred in small seams running through the quartzite ore, and in places was quite rich in gold, the ash being colored a bright purple by the finely divided particles of metal.

A NEW CALIFORNIA PIPE-LINE.

BY OUR SPECIAL CORRESPONDENT.

The new pipe-line of the Coalinga Oil Transportation Company, 110 miles long, running from the Coalinga oil-field, in Fresno county, over the Coast ranges to tidewater on Monterey bay, was completed and put into operation a few days ago. This is the second longest pipe-line on the Pacific coast, the Standard's pipe-line from the Kern River field to San Francisco bay being 275 miles in length. The new line is an important feature in the progress of the California oil industry. Through it a large portion of the product of the Coalinga field will be taken direct to oil-carrying vessels at a small, but yet undetermined cost, and it should work an improvement in the commercial conditions of that field. It will transport exclusively the oils produced or purchased by this and allied companies, controlled by the same interests, whose business is the marketing of fuel oil. In this the company gains an important competitive advantage, and anticipates a widening of its markets throughout the Pacific region.



CARREAGA PUMPING STATION, SANTA BARBARA LINE.

VIEW IN COALINGA OIL-FIELD.

The new line is of 6-in. pipe, and has an estimated capacity of 12,000 bbl. a day. The highest point in the line has an altitude of 2,568 ft., 22 miles from the initial end, and represents a lift of 1,800 ft. So far, but four pumping stations have been installed, one in the oil-field, and the others 15.45 and 81 miles distant, respectively. Each station is provided with two 16 by 5 by 12 in. pumps, operated by steam power from boilers of 240 h.p. The line is designed to maintain a working pressure of 1,000 lb. It is buried 2 ft. underground throughout its length, and is carried under the Salinas river in crossing that valley. The terminal is in the town of Monterey, and the oil is delivered to storage tanks, 100 ft. above a loading wharf. The line was put into operation in four months from the beginning of pipe laying, and has cost about $750,000. The same interests control the Matson Navigation Company, which operates a fleet of steam and sailing oil carriers, which have been delivering oil to the Hawaiian Islands, Alaska, Puget Sound ports, Portland, San Francisco and other points. These interests also control the National Oil & Transportation Company, which is operating a 40-mile pipe-line from the Santa Maria oil-field, in Santa Barbara county, to the coast at Alcatraz landing. The production of the Coalinga field is now estimated at over 16,000 bbl. a day, about four-fifths of which has a gravity of 22° to 24° B., the rest comprising a small output of the light oils of the west side, but being mainly a heavy product, similar to that of the Kern county fields. Marketing conditions have been a serious handicap in this field, as elsewhere, since the cost of transportation by rail to San Francisco bay is 40c. per barrel. The Standard operates a Coalinga branch of its San Joaquin valley pipe-line, but has recently refused to buy oils of less than 22° gravity, for which grade it quotes 20c. a bbl. The new line thus opens a market for the heaviest oils, and brings an important new purchaser into the field; but the effect in prices to the producer, and to fuel oil consumers on San Francisco bay and elsewhere, remains to be developed. It is understood that this company is preparing to construct another pipe-line from the Coalinga district to San Francisco bay.

The oil industry generally exhibits much activity in the fields of transportation and consumption under the stimulus of the large supply and low prices. The plans of the independent producers of the Kern river field are yet inchoate in the hands of the temporary organization, which is seeking a way to secure better and more stable prices and markets for the independents. The Pacific Coast Oil Company, the Standard Oil interest, has begun grading for a large extension in its big refining plant at Point Richmond, on San Francisco bay; by which the capacity will be much enlarged. The improvements will include several brick buildings, a shop for repairing oil cars, and new storage tanks.

COAL IN MANCHURIA.—A correspondent of the London *Iron and Coal Trades Review* writes, under recent date: "South of Fushau, over the Hun river, are some rich coal mines with good steam coal easily worked. For hundreds of years no one dared to excavate into the sacred hills in which the Imperial Dragon is said to dwell. A few years since, however, the Russo-Chinese Bank obtained a special privilege and found what were believed to be coal-beds which had never been worked, and certainly, in Chinese historical records, nothing has been found relating to them. The Russians at first labored with primitive native methods, attacking the nearer seams, but later on determined to bore deeper and introduce machinery. A special engineer, M. Nope, was placed in charge, and he discovered that at deeper levels there had existed thick coal-beds which had been completely worked out by perpendicular shafts, denoting in every way a high degree of scientific skill, which is entirely lacking in all Chinese mining industries within historic times."

PIPE-LAYING GANG AT WORK.

TREATMENT OF SLIME BY CYANIDATION IN THE BLACK HILLS.*

BY CHARLES H. FULTON.

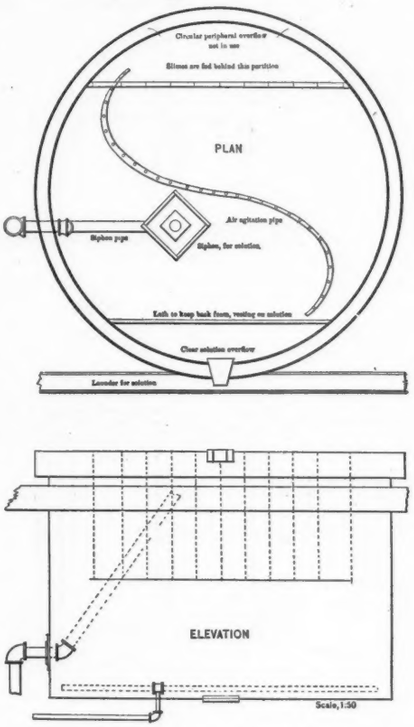
Two methods of slime treatment are practiced in the Black Hills; the first having the treatment of the slime completed in the vat into which it is originally charged, and in which most of the agitation is done by means of compressed air; and the second repeatedly transferring the slime from one vat to another before it is discharged, the agitation being done by means of centrifugal pumps.

The first method is practiced at the Horseshoe mill. There are 16 slime-tanks, 14 ft. in diameter and 10 ft. deep; and two, 30 ft. in diameter and 16 ft. deep. The details of the construction of a slime-tank are shown herewith. A partition extends from the top to nearly the bottom, at one side of the tank, behind which the slime is charged as it comes from the cones. The vat is filled with barren solution, and the slime is then charged; a strip of wood or lath resting on the surface of the solution holds back any foam and allows the surplus solution to pass off clear at the lip of the tank.

The slime settles rapidly and the solution usually runs off clear at the lip until the slime has accumulated to a depth of about 50 in., which is equivalent to 25 or 30 tons of dry slime. As soon as the solution at the lip becomes cloudy, the slime-charge is turned into the next tank, and the slime in the tank just filled is permitted to settle. This settling occupies about 10 hours, during which the supernatent solution is decanted by means of a simple wooden frame having a pipe at the center connected with a take-off pipe about 18 in. from the bottom of the vat. It is important to have the slime settle and to decant as closely as possible without taking off the muddy solution, usually within an inch of the settled slime. The main object of the slime-treatment is to remove the dissolved values by successive dilutions, hence, unless the decantation is extremely close each time, this object will not be fully gained. As soon as the decantation is complete, about 40 tons of barren solution are added to the vat, the contents during the addition being agitated by the introduction of compressed air at a pressure of 40 lb. per sq. in. The air enters the bottom of the vat through two S-shaped pipes, crossing each other, and having 0.12-in. perforations. This air-agitation is the only one that the slime receives, but it has the weak point that it fails to move all of the material (especially the heavier portion of the slime and the fine sand) at the bottom of the vat. For this reason the contents of a vat are not sluiced out, but that portion of the slime which will run out by the bottom gates is allowed to flow away, leaving from 2 to 4 tons of heavy thick slime, which forms a portion of the succeeding charge, thus getting two treatments for this material. Each charge of slime is washed four or five times with barren solution and once with water, the quantity of each wash amounting to 40 tons, which is equivalent to 6.5 tons of barren solution and from 1 to 1.6 tons of wash-water, for each ton of dry slime treated.

The discharged slime contains approximately 50 per cent of moisture. From ore averaging from $8 to $9 per ton in value, the dried slime-tailing averaged $1.75 per ton in value, of which from 30 to 40 per cent still existed as gold in solution. The washed slime-tailing, therefore, carries $1.25, and the solution discharged as moisture $0.52 per ton.

In the treatment of slime by successive additions of dilute solutions for the extraction of the values, a definite quantity of solution per ton of dry slime is used, and it is theoretically necessary, in order to get the maximum extraction, to use this quantity in a comparatively large number of small additions, rather than a few large ones. Thus, in treating a ton of slime by 6 tons of solution, it is theoretically better to give six additions of 1 ton each, rather than two additions of 3 tons each, but in case any one addition should be larger than the other, naturally it would be applied to the slime of highest value. It must be borne



DETAILS OF SLIME TANK.

in mind, however, that during the slime-treatment, values are constantly going into solution, so that while the values in the solution are being reduced by dilution, they are constantly being augmented by the solution of new values. For this reason, the solution, which is finally discharged as moisture with the slime-tailing, will never be as low in value as the dilution calls for. Since the cost of adding a definite quantity of dilute solutions to the slime is the same, irrespective of the values extracted by these solutions, it is evident that the economic limit is soon reached beyond which a further dilution will not pay. Few of the mills can afford to apply more than four or five dilutions. Moreover, the greater the number of dilutions the larger the quantity of solution to be handled in the mill. Although at the present time the mills handle a large quantity of solution per day, the application of an extra water-wash to the slime would not be very objectionable, provided the decantation from the last wash were to run to waste through a large zinc-box containing the poorer grade of shavings and the dust from the lathe. The saving resulting from the increased extraction and the utilization of otherwise waste material probably would be appreciable.

The second method of treatment, in which the slime is successively transferred from one vat to another, is illustrated by the practice at the Dakota mill. Here the slime from the cones is alternately charged into the loading vats No. 1 and 2, which are 20 ft. in diameter and 137 in. deep. Each vat is filled for 12 hours and then allowed to settle for 10 hours. The clear solution at the top is continually decanted off and finally withdrawn to within 1 in. of the settled slime, which is then pumped by a 4-in. suction centrifugal pump to vat No. 3, barren solution being continually added to the suction of the pump during the transfer, which occupies from 1 to 2 hours. In vat No. 3 the slime is permitted to settle again for 10 hours, the clear supernatent solution being decanted off meanwhile. The slime is then pumped to vat No. 4, barren solution being added to the suction as before, and receives an additional agitation for about an hour by pumping the slime from the bottom and returning it over the top of the vat. The settling and decanting is then repeated, and the slime run into vat No. 5, from which, after settling and decantation of solution, it is transferred to vat No. 6; this time wash-water is used instead of barren solution. The quantity of wash-water added is equivalent to the quantity of moisture in the slime. The last settling takes place in vat No. 6, the solution is decanted and the slime discharged. The total time required for the treatment of the slime is 5 days.

In order to coagulate the slime, from 4 to 6 lb. of lime per ton of ore are added at the batteries. The addition of lime, being the only one made in the mill, must be carefully adjusted; if too little be added the slime will not coagulate readily, and if too much there will be subsequent trouble in the precipitation of the values.

The following data of slime-treatment at the Dakota mill are of considerable interest: During five and a half months 6,681.67 tons of slime were treated, which amounted to 33 per cent of the total quantity of ore crushed. The average value of the ore during this period was $4.75 per ton. The slime-tailing, dried and unwashed, assayed $1.31 per ton, thus giving a recovery of values from the slime of 72.28 per cent. The washed slime-tailing assayed $0.912 per ton, showing a solution of the values of 80.7 per cent, and a loss of soluble gold of $0.40 per ton, or 8.42 per cent of the value of the ore. The slime is discharged with 50 per cent of moisture, which consists of solution having a strength of 1.07 lb. of KCN per ton. Since there is a ton of this solution going to waste for every ton of dry slime discharged, there were lost during the above period 7,147.6 lb. of KCN, which, at $0.23 per pound, had a value of $1,644. Adding to this the loss in dissolved gold amounting to $2,672, the total loss was $4,316, or $0.64 per ton. These figures show clearly the weak points of the decantation-system of slime-treatment. The Dakota mill is one of the most successful mills in the Black Hills treating practically the lowest grade of silicious ores handled in the district.

GOLD MINING IN LAPLAND.—As the results have been unsatisfactory, the gold-mining industry in Lapland has been brought to a close. One operator, who had established a gold-washery at Kultala Waterfall, failed.

*Abstract of a paper read before the Lake Superior meeting of the American Institute of Mining Engineers, from advance sheets not revised by the author.

COAL WORKING IN SAXONY.

The Prussian Commission, appointed in 1901 to investigate the question of the fall of stone and coal in mines, visited a number of collieries in Saxony and Austria. According to their report, as abstracted by the London *Iron and Coal Trades Journal,* in Saxony, the system of removing the coal in panels is most general. Formerly, the packing of the goaf, even with the longwall method of working, was rarely resorted to, and then only with a view of getting rid of a superabundance of rubbish, and thus avoiding the cost of its transport above ground. In recent years, however, it has become the practice to fill in the waste, especially with thick coal seams in close proximity to one another, with a view to preventing the possible outbreak of fires, and in order to be able to work the measure in layers, and to prevent the subsidence of the surrounding strata. In the colliery of the Bockwa-Hohndorf Company, near Oelsnitz, in the Erzgeberg, the pressure below ground is very great. Four coal seams, varying from 5 ft. to 16 ft. in thickness, are worked, and the depth attained is 3,000 ft. The heavy pressure encountered is ascribed to the fact that the entire field is traversed by a number of fissures, and, owing to this disturbance in the strata, they lack cohesion, and have a tendency, when the coal is being worked, to slip continuously. The temperature is high, and there is a danger of an outbreak of fire in the old workings. The goaf is not packed, because the necessary material is not at hand.

At the Pluto and Merkur shafts of the Gersdorf Steinkohlenbauverein the system of packing is extensively employed. In the thick seams, as the panels are removed, chocks, made of timber and rubbish, are erected at a distance of 60 in. from each other. They are 10 ft. in length, and 8 ft. 4 in. wide. Fig. 1 gives a representation of this method of working the pillars, which considerably relieves the pressure at the face and improves the ventilation. At the same colliery, when the roof is brittle, the longwall system is adopted, and as the ordinary rubbish is not sufficient in quantity to completely fill in the waste, the gate-roads are furnished with a wall, consisting of chocks of wood, with intermediate packs of gob-stuff, while the goaf behind is packed with chocks of timber placed at equal intervals. In Fig. 2 we have a representation of the conditions at the face when the commissioners visited the mine. If the roof is very brittle the coal is taken out in sections 30 to 40 ft. wide. The timber piles measure, generally, 6 by 6 ft., and are placed at intervals of 40 in. in the direction of the dip, and 80 in. when measuring in the direction of the strike. In another coal measure at the same colliery, which is 22 ft. in thickness, the upper portion, about 13 ft. deep, is removed in pillars in the ordinary way, and, after the lapse of about two years, the lower part is worked. The floor in the first operation is completely covered with planks, which constitute the roof when working the lower portion of the seam. As in the Glückauf coal measure, the rubbish is utilized for packing the goaf. The timber is ultimately recovered. (See Fig. 3 and 4.) Fig. 3 shows the face when working the upper part of the seam, and Fig. 4 gives the view when extracting the lower portion.

This system of removing the coal in two layers is found in vogue at other collieries in Saxony, where the measures possess considerable thickness. The Russkohlen seam of the Tiefbau-Schächten, which is from 20 to 23 ft. in thickness, is, for the most part, worked in two layers, first the upper and subsequently the lower bank being removed. The latter has, however, also at times been successfully worked on the longwall system first, and, after a number of pillars had been thus extracted, the removal of the upper bank was commenced. The middle bank of coal, 5 ft. 4 in. wide, is worked first in strips 13 ft. in width. Fig. 5 shows the timbering at the face. The upper bank, 2 ft. thick—separated by 32 to 60 in. of slate, 4 in. of coal and 16 in. of shale from the middle seam—is then removed by taking walls 40 ft. wide. The timbering is shown in Fig. 6. Only

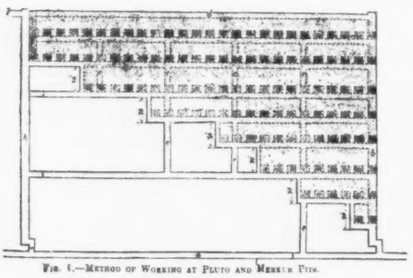


FIG. 1.—METHOD OF WORKING AT PLUTO AND MERKUR PITS.

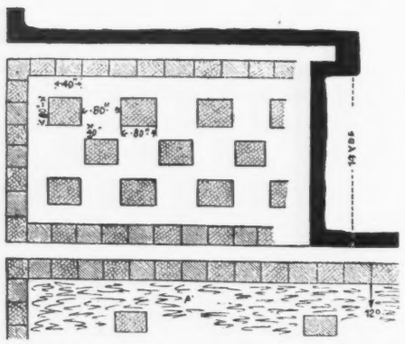
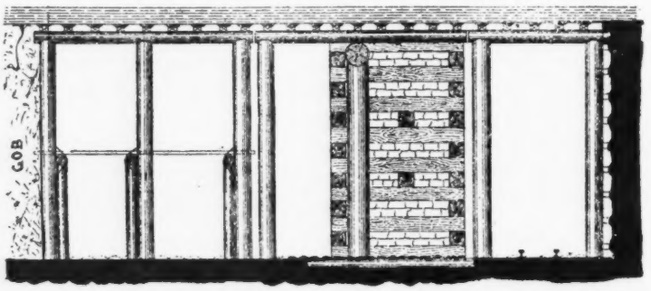


FIG. 2.—METHOD OF WORKING THE GLUCKAUF SEAM; PLUTO AND MERKUR PITS.

FIG. 3.—WORKING UPPER PORTION OF SEAM.



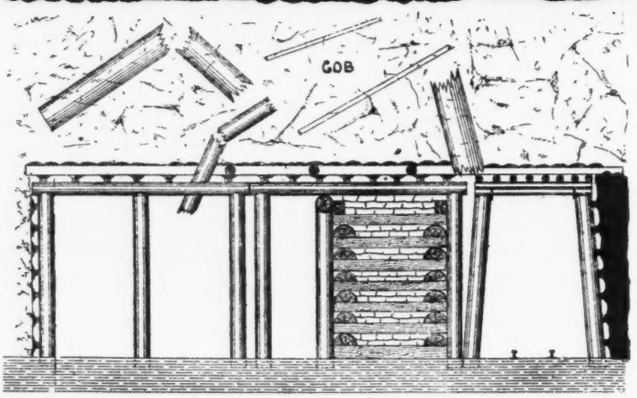


FIG. 4.—WORKING LOWER PORTION OF SEAM.

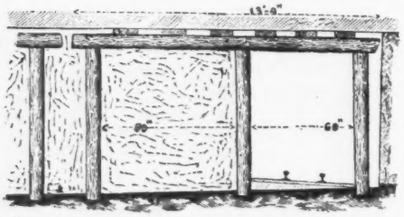


FIG. 5.—FACE AT THE MIDDLE BANK OF THE RUSSKOHLEN SEAM, TIEFBAU PIT.

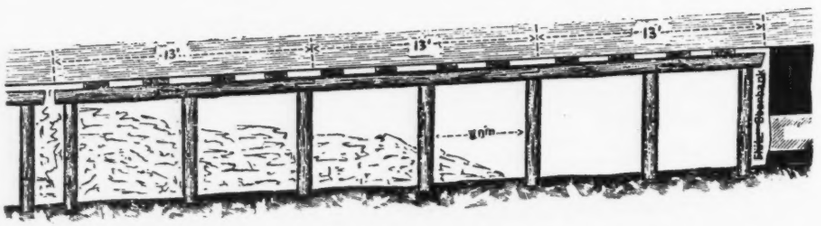


FIG. 6.—TIMBERING IN RUSSKOHLEN UPPER BANK—TIEFBAU PIT.

the rubbish obtained in working is used for packing. When the old workings have settled the lower bank of coal, 7 to 14 ft. thick, is taken out. In working this seam, in order to overcome the danger of underground fires, the goaf is flooded with mud. The latter fills up all the interstices with a thoroughness which cannot be attained by any other system. As this method of filling in the waste, in the case of working coal seams very close to each other, has a decided tendency to diminish the danger of falls from the abandoned workings, the following details are given:

The goaf is carefully packed with the rubbish. The mud must contain as little coal as possible, and should mainly consist of clay, in solution. It is transported in a viscous condition in tubs, furnished with slide doors, to the spot where it is to be used. It is then thrown into a pit and stirred well with water, and thence conveyed through a pipe into the rubbish. Before entering the pipe the mud is made to pass through a fine sieve, to prevent any solid matter passing with it. When the old workings are on the rise, the side of the road is shut off by a continuous wall of packs, which is lined with planks. Should a leakage occur, it is found that, by stopping the operation of flooding a few days, the evil is remedied. An overflow pipe fitted up indicates when the filling-in process is complete. When the work is ended the mud in the upper portion of the goaf, or wash, is already found to be of a plastic character, and no water flows from it. Small triplex pumps are employed for raising the mud to the highest point of the abandoned workings to be flooded. The lower bank can then be worked on the longwall system without difficulty. The timbering consists of the usual props and capping pieces, which, in working the lower bank of the seam, need not be so strong, because the clay-cemented packs constitute a fairly good roof, which, for short distances, can be left unsupported. When working the coal from below upwards, the flooding of the waste with mud is not practised. It is generally found in these thick seams that by extracting the upper bank first, the pressure on the lower coal strata is greatly relieved.

BRIQUETTES ON FRENCH RAILROADS.—Coal briquettes form 10 per cent of the fuel used on the Paris, Lyons & Mediterranean Railway, these being made of slack and dust from the company's mines. It is found that steam can be raised more quickly with the briquettes than without them.

NEW LAKE ORE CARRIERS.—The Pittsburg Steamship Company, which is the lake department of the United States Steel Corporation, has placed contracts for four steamers with the American Shipbuilding Company. The new boats will be 9 ft. longer than the *Augustus B. Wolvin*, now the largest freighter on the lakes. They will cost $430,000 each. They will be 569 ft. over all, 549 ft. keel, 56 ft. beam and 31 ft. deep. They will be built on what is known as the 12-ft. center hatch, arch semi-straight, incline hopper construction, with 34 hatches and no bulkheads in the hold. They will have a capacity of 8,500 tons water ballast, which will enable them to run in any kind of weather in water ballast trim. They will have a carrying capacity of 10,000 gross tons on a mean draft of 19 ft. According to the contracts, the four steamers will be delivered between May 1 and July 1, 1905.

MINERAL PRODUCTION OF INDIA.

The official statement recently issued by the government of British India shows that there was in 1903 a satisfactory increase in the mineral production. The most important item is coal, and the output for two years past is shown in the following table, in tons:

	1902.	1903.	Changes.
Bengal	6,259,236	6,361,212	I. 101,976
Nizam's Territory	455,424	362,733	D. 92,691
Assam	221,096	239,328	I. 18,232
Central India	171,538	193,277	I. 21,739
Central Provinces	196,981	159,154	D. 37,827
Other districts	120,205	122,682	I. 2,477
Totals	7,424,480	7,438,386	I. 13,906

The increase was not large last year, much lighter, in fact, than for several years previously. This was largely due to the dullness of business, and, consequently, of the coal trade. The quantity of coal exported rose slightly, and amounted to nearly 500,000 tons, a large part of which goes to the Straits Settlement and to Ceylon. India now supplies nearly all her own wants in fuel, and the imports of foreign coal last year amounted to only 206,829 tons, about three-quarters of which was from Great Britain. The railroads of India take a large share of the coal produced in the country, their consumption in 1903 having amounted to 2,203,889 tons. The greatest development has been in the Raniganj field, which is only about 140 miles from Calcutta. The only new movement last year was in the arrangements made to manufacture briquettes from the Bikaner lignite.

The development of the petroleum resources of Burma and Assam has been very large. The production of petroleum is shown in the following table, in gallons:

	1902.	1903.	Changes.
Burma	54,848,980	85,328,491	I. 30,479,511
Assam	1,756,759	2,528,785	I. 772,026
Panjab	1,949	1,793	D. 156
Totals	56,607,688	87,859,069	I. 31,251,381

As with coal, the increase in petroleum production has affected the imports of foreign oil, which have largely decreased during the past few years.

The production of gold, which was chiefly from the Kolar field, in Mysore, is shown in the following table, in ounces:

	1902.	1903.	Changes
Mysore (Kolar field)	515,460	598,709	I. 83,249
Nizam's territory	.....	3,414	I. 3,414
Burma	2,179	1,095	D. 1,084
Totals	517,639	603,218	I. 85,579

Work has begun on the mines in the Nizam's dominions, and they showed a production last year for the first time. In Burma there was a decline on account of the exhaustion of some of the veins in Katha. A little washing for gold is carried on in the rivers of the Panjab, and dredging operations, with promising results, have commenced on the upper Irawadi river.

The native industry in smelting iron, which has existed in most parts of India from very ancient times, has undergone a gradual decline in the face of cheaper iron and steel imported from Europe. But the industry still lingers in parts of the Madras presidency and the Central Provinces, showing, in fact, a tendency towards improvement in the latter area. Except in Barakar, where the conditions for the manufacture of pig iron are favorable, on account of the proximity of ore supplies and good coking coal, no successful attempt has been made to manufacture iron on a large scale in India.

The most remarkable development has taken place in manganese ore. This industry exists in Vizianagram and in the Central Provinces. This ore is of a very high grade, ranging from 51 to 54 per cent metal, and is therefore able to pay the freight over 500 miles of railroad, besides the shipment charges to Europe and America. All the ore is exported. The following table shows the total output of manganese ore, in long tons:

	1902.	1903.	Changes.
Central Provinces	89,609	101,554	I. 11,945
Madras	68,171	63,452	D. 4,719
Totals	157,780	165,006	I. 7,226

Mining for graphite still continues in Travancore, although the deposits there are not as rich as those of Ceylon, and the output for 1903 was only 3,394 tons, a decrease of 1,181 tons from 1902.

The mica trade shows no considerable change. Exports were 1,078 tons, an increase of 58 tons over 1902. The centers of production are in the Nellore district in the South, and in the pegmatite belt on the borders of Hazaribagh and the Monghyr districts, in Bengal. Prospecting is going on in several other places.

The magnesite deposit of the Chalk hills in the Madras presidency has attracted attention. The mineral occurs in very pure form in a network of veins. The total production last year was only 826 tons.

Slate quarrying is an important industry in the foothills of the Himalayas, near Rewari, in the Panjab and in the Kharakpur hills, in the Monghyr district.

Tin-mining continues on a small mining scale in southern Burma. The ore reported in 1903 was 110 tons, all of which came from the Tenasserim district.

The exports of jade from Rangoon to the Straits and China were 2,402 cwt. This is a decrease of 1,554 cwt. from 1902, but the mineral was of a much better quality. There is also a certain quantity sent overland from Upper Burma to China, the quantity of which is difficult to ascertain. China is practically the only market for the mineral, which is very highly valued in that country for ornamental purposes. Jadeite occurs principally with serpentine in an igneous rock in the Myitkyina district of Upper Burma.

BELGIAN PIG-IRON PRODUCTION.—The output of pig-iron from Belgian blast furnaces during September comprised 20,400 tons of forge pig, 8,700 tons of foundry pig, and 77,850 tons of steel-making pig—a total of 106,950 tons, which compares with 103,650 tons in September, 1903.

COAL FOR THE RUSSIAN NAVY.—In view of the excessive cost to Russia of British coal, which is used by the Baltic fleet and by government works in the Northwest Provinces to the extent of 2,400,000 tons annually, the General Administration of Maritime Commerce has received orders from the Czar to consider the best means of replacing British by Russian coal.

IRON AND STEEL WORKS IN CHILE.—The British consul at Santiago reports that a contract, which has yet to be ratified by Congress, has recently been signed between the Chilean Minister of Public Works and Eugène Carbonel, for the establishment in Chile of an iron and steel manufactory. It is stated that a well-known French firm of steel manufacturers is largely interested in the undertaking.

BOOKS REVIEWED.

Untechnical Addresses on Technical Subjects. By James Douglas. New York; John Wiley & Sons. London; Chapman & Hall, Ltd. Pages, 84. Price, $1.

This little book of 84 pages gives in a convenient form three addresses made by a leader of technical science, who is so well known and so much respected by the professions to which this JOURNAL ministers that endorsement is supererogatory. The thoughtful technical man purchasing this book finds it a strong stimulant to straight thinking and earnest effort; it was for this purpose that the author delivered the addresses. They fulfil their purpose.

Statistical Compilations on Lead, Copper, Zinc, Tin, Silver, Nickel, Aluminum and Quicksilver, 1894-1903. *Eleventh Year.* Compiled by the Metallgesellschaft and the Metallurgische Gesellschaft, A. G. Frankfort-on-Main, Germany; the Metallgesellschaft. Pages, 68.

This valuable compilation has, in the eleven years of its publication, come to be an authority in the metal trades. Its statistics of production and commercial movement are carefully compiled from the best available sources. The compilation includes, as will be seen from the title, all the metals of economic or trade value, and shows the extent of their consumption by all the leading commercial and manufacturing nations of the world.

The Century in Phosphates and Fertilizers. A Sketch of the South Carolina Phosphate Industry. By Philip E. Chazul. Charleston, S. C.; printed for the author. Pages, 76; illustrated.

This is a sketch of the South Carolina phosphate industry, originally prepared for the 'Centennial Edition' of the Charleston *News and Courier,* and now reprinted, with some corrections and additions. It gives a general description of the phosphate deposits of South Carolina, with a history of their development, and an account of the present condition of the industry. It presents, in connected form, many facts hitherto accessible only in scattered papers and publications. It has been carefully compiled and arranged, and, while necessarily brief, it makes an interesting monograph.

The Port Henry Iron Ore Mines, 1849-1903. Port Henry, N. Y.; issued by Witherbee, Sherman & Company. Pages, 24; illustrated.

This pamphlet, descriptive of an interesting and valuable deposit of iron ore on the western side of Lake Champlain, consists of a reproduction of two articles. The first appeared in the *Iron Age* of December 17, 1903, and contains an excellent description of the iron mines at Port Henry and its neighborhood, and of the extensive magnetic separating plant operated in connection with those mines. The second article is from the *American Railroad Journal,* published in 1849, and describes the mines as they were operated 55 years ago, the blast-furnace, then newly built, and other works maintained in connection with the mines. At the earlier date the Port Henry magnetite was used in a number of the forges and bloomaries which were then operated in the region, as well as in the blast-furnaces at Port Henry and at several points along the Hudson. The interesting fact is that these mines, worked for over half a century, are still large producers. In fact, considerable quantities have been exported this year. The two papers make up a record well worth preservation.

Interborough Rapid Transit. The New York Subway, its Construction and Equipment. New York, 1904; prepared and issued by the Interborough Rapid Transit Company. Pages, 160; illustrated.

This volume has been issued as a memorial of the opening of the New York Subway for public service. It is more than a memorial simply, since it is a valuable addition to the literature of engineering. We have all heard and read much of the Subway, but here the facts are collected and put on record. The names of the authors are not given, but the various descriptions have evidently been written by experts in their several lines, and we presume that the work has been done mainly by the engineering staff. The arrangement and presentation have certainly been in the hands of a competent editor.

The introduction gives a history of the different projects and designs for underground railroads in New York; of the entrusting of the work to the Rapid Transit Commission; of the final completion of the plans and the undertaking of the work by Mr. John B. MacDonald and his associates. It describes the difficulties in the way and the methods by which they were finally overcome. It gives a full account of the organization and management of the work, and of the arrangements for operating the completed lines. This introduction is in condensed form, necessarily, but is a clear and connected narrative throughout.

Following the introduction are twelve chapters treating respectively of the routes adopted for the Subway lines; the construction methods used; the power-house; the power plant used to operate the lines; the system of electrical supply; the electrical equipment of the cars; the lighting of the tunnels and stations; the rolling stock—cars and motors; the signal system; the drainage of the Subway; the repair and inspection sheds; the sub-contracts and the sub-contractors. From this list it will be seen that the subject is thoroughly covered.

The book is profusely illustrated, mainly by reproductions of photographs. These have been well chosen and serve to help out the text in giving a full understanding of the subject. The printing and mechanical execution of the book are of the best kind, and, altogether, it is a worthy record of a most important engineering work.

Missouri Bureau of Geology and Mines. The Quarrying Industry of Missouri.. By E. R. Buckley and H. A. Buehler. Jefferson City, Mo.; State Printers. Pages, 372; with maps and illustrations.

This report, covering an extensive and important industry, is based upon extensive field work extending over nearly three years. It included examinations of quarries and of important deposits of building stone in the State, and also many tests of different varieties of stone in the laboratory. Statistics of the industry were also carefully collected and compiled. Missouri has a variety of excellent building stones, including granite, limestone and sandstone; while onyx for decorative purposes is found in the caves of the Ozark mountains. The report has been devoted to a discussion of the most important and best developed quarries, although there have been included descriptions of many quarries from which the stone is used almost exclusively to supply a local market. Although not so divided, the volume really consists of three parts: first, a general discussion of the demands, uses and properties of stone used in building constructions; second, a description of the Missouri quarries, arranged under the geological formations to which the stone being quarried belongs; third, a discussion of the results of the laboratory tests on stone from different quarries in the State, including tables. There is also an appendix giving in brief the composition and kinds of rocks and rock structures. The tests described are interesting and instructive, showing that some of the popular ideas relative to the durability of building stone are not well founded.

The maps and illustrations add much to the value of the book. They include several plates showing results of the laboratory tests. These include photographs of stone after the breaking and crushing tests, and a number of thin sections of rocks, as seen under the microscope. These give an idea of the structure of the stone, upon which its strength and durability largely depend. Others are of interest from a geographical point of view. A good instance of this is found in two plates which show clearly the manner of occurrence of the stylolites and chert nodules, which are found so abundantly in the Burlington limestone.

The volume includes also some accounts and illustrations of important buildings constructed of Missouri stone. It ought to be appreciated by the people of the State, and especially those interested in quarrying and building.

BOOKS RECEIVED.

In sending books for notices will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of this JOURNAL.

Bulletin Russe de Statistique Financiere et de Legislation. 1904. *Volume I.* St. Petersburg, Russia; V. Kirschbaum. Pages, 180.

United States Bureau of Education. Public, Society and School Libraries. Washington; Government Printing Office. Pages, 260.

Los Criaderos de Hierro de Burguillos, Badajez. By Antonio Gascon y Miramon. Madrid, Spain; Ricardo Rojas. Pages, 44.

Etude Theorique des Alliages Metalliques. By Leon Guillet. Paris, France; Vve. Ch. Dunod. Pages, 232; illustrated. Price (in New York), $3.

Les Richesses Minerales de la Nouvelle Caledonie. By E. Glasser. Paris, France; Vve. Ch. Dunod. Pages, 560; illustrated. Price (in New York), $3.50.

Rhodesia Chamber of Mines. Ninth Annual Report. 1903-1904. P. L. Jenkins, Secretary, Buluwayo, Rhodesia; published by the Chamber of Mines. Pages, 108.

Geological Map of Indiana. Compiled by T. C. Hopkins. Indianapolis; published by the Geological Survey of Indiana. One sheet, scale 4 miles to 1 inch.

Report of the Department of Mines of Pennsylvania. Anthracite Region. 1903. James E. Roderick, Chief of Department of Mines, Harrisburg, Pa.; State Printer. Pages, 672.

Künstlicher Graphit. By F. A. J. Fitzgerald. Translated into German by Max Huth. Halle-a.-S., Germany; Wilhelm Knapp. Pages, 60; illustrated. Price (in New York), $1.

Methods and Routes of Exporting Farm Products. Prepared by Edward G. Ward, Jr., for the Department of Agriculture. Washington; Government Printing Office. Pages, 64.

Geologic Atlas of the United States. No. 111. *Globe Folio, Arizona.* Washington; Engraved and printed by the United States Geological Survey. Seven plates and 18 pages text.

Decouvert d'un Puissant Gisement de Minerais de Fer dans le Grand Bassin Houiller du Nord de la Belgique. By Guillaume Lambert. Brussels, Belgium; J. E. Goosseus. Pages, 24; with maps and illustrations.

Mechanical Appliances, Mechanical Movements and Novelties of Construction. By Gardner T. Hiscox. New York; The Norman W. Henley Publishing Company. Pages, 400; illustrated. Price, $3.

The Chemistry of Cyanide Solutions Resulting from the Treatment of Ores. By J. E. Clennell. New York and London; THE ENGINEERING AND MINING JOURNAL. Pages, 164. Price, $2.50.

Elektrolytisches Verfahren zur Herstellung Parabolischer Spiegel. By Sherard Cowper-Coles. Translated into German by Emil Abel. Halle-a.-S., Germany; Wilhelm Knapp. Pages, 20; illustrated. Price (in New York), 35 cents.

Commercial Relations of the United States with Foreign Countries during the Year 1903. *Volume I.* Prepared by the Department of Commerce and Labor. Washington; Government Printing Office. Pages, 752.

A History of Columbia University, New York. 1754-1904. Prepared by a Committee of the Faculty. New York; the Columbia University Press, the Macmillan Company, Agents. London; Macmillan & Company, Ltd. Pages, 496; illustrated. Price, $2.50, net.

United States Geological Survey. Production of Aluminum and Bauxite in 1903. By Joseph Struthers. Pages, 20. *Production of Magnesite in* 1903. By Charles G. Yale. Pages, 8. *Occurrence of Sulphur and Pyrite, and Their Production in* 1903. By Joseph Hyde Pratt. Pages, 30. *Manufacture of Coke in* 1903. By Edward W. Parker. Pages, 76. *The Stone Industry in* 1903. By Altha T. Coons. Pages, 208. *Statistics of the Clay Industries of the United States.* By Jefferson Middleton. Pages, 96; with chart. Washington; Government Printing Office.

CATALYTIC PRODUCTION OF SULPHUR TRIOXIDE.—G. Lunge and K. Reinhardt have found (*Zeitschrift* für angewandte Chemie, 1904, XVII, 1041-1051) that with pure ferric oxide (Aguas Teñides burned pyrites) catalytic action begins under favorable conditions at about 400° C., and reaches its maximum at 625° C., at which temperature about 70 per cent of the total sulphur dioxide is converted. The addition to ferric oxide of small quantities of cupric oxide is without influence, but larger quantities act prejudicially. Silica has a very perceptible catalytic action effecting a conversion of about 10 per cent at 700° C.

Manganese ore analyzing 70 to 80 per cent is employed in the chlorination process of gold extraction, notably in California, Colorado and Queensland. Lower grade ores are better adapted to the manufacture of steel.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

Letters should be addressed to the Editor.

We do not hold ourselves responsible for the opinions expressed by correspondents.

Prospects of the Zinc Industry.

Sir—Signs are multiplying that the frames of mind of both the zinc ore producers and of the spelter manufacturers of the Central West are not happy ones at the present time. On the one hand there is the high price of ore which the smelter pays, and on which he can barely come out even, while on the other hand, the miner stands in fear of the competition of western ore, and all indications of the failure of this ore to give satisfaction are industriously circulated.

Yet nothing is more certain than that the history of the lead business will be repeated, and that the zinc industry of the central West will have to play second fiddle to that of the farther West, and the prices obtained for Joplin ore will become of gradually diminishing importance in regulating spelter prices.

The western mountain country is full of zinc ore, from British Columbia into Mexico, and by easy means the grade can be kept up to 40 per cent zinc. Besides this, there are other values for which the buyer rarely pays. Leaving these values out of consideration here, the Kansas natural gas smelters ought to make money on this ore. But from the viewpoint of the Kansas man, if he is a producer of a grade of spelter higher than common, the western ore is far from being choice material; besides he is not equipped to handle it. However, he should change his equipment, and could then stop paying $50 for 1,280 lb. zinc in crude ore, where he can get 800 lb. for $12 or less, and he would find that his percentage of yield from his 40 per cent zinc ore would be as high as from his 64 per cent ore, if he would learn how.

In time he will; but when that time arrives his natural gas is apt to give out, placing him more on an equality with his brethren farther west. However, here it is where the other values will come in and Kansas is going to "lose out."

Europe makes money on western ore, with high-priced coal and cheap labor; so do, according to the statement of the American Smelting & Refining Company, the works at Peublo, Colo., with labor that is higher priced than in Kansas, and with coal of fair price and quality. The western works, now running or about to be erected, can afford to lose money on their product as long as they can more than offset the loss by the sale to the lead people of residues containing value, while the central West will not have this market, and if the attempt were made to smelt residues without admixture of other ores, the loss would be heavier.

It is admitted that the cheaply mined Joplin ores are practically exhausted. The demand for ore of moderate price will be met by ore from the mountain territory, and the control of the spelter market will fall gradually into the hands of the people who control the lead business of the country, either by the building of their own works, or by forming affiliations with works that can meet the demand of lead smelters or merchantable residues.

In spite of heroic attempts to the contrary, the day of the direct-fired coal furnace is about past, and is not apt to return. The regenerative furnace, fired with producer gas, is superior in regard to fuel economy and independence of men, notwithstanding some drawbacks, and will become a necessity where refractory ore is used, and when natural gas is no longer available. H.

Wytheville, Va., Oct. 22, 1904.

ABSTRACTS OF OFFICIAL REPORTS.

Republic Iron & Steel Company.

This company is one of the older combinations in the iron trade. It owns blast-furnaces, rolling mills, steel works and other plants in various parts of the country, as well as iron ore and coal mines and coke plants. Its more important products are bars, rods, spikes and similar material. The report is for the year ending June 30, 1904.

The capital is $20,852,000 in preferred, and $27,352,000 in common stock, of which there is held in the company's treasury $435,100 preferred and $161,000 common stock.

The income account for two years past is reported as follows:

	1903.	1904.
Gross sales	$25,647,170	$17,242,96
Gross profits	$4,123,500	$1,306,068
Depreciation	1,382,600	1,560,256
Profit or loss	P. $2,740,900	L. $254,188
Dividends paid	1,427,083	357,296
Surplus or deficit	S. $1,313,817	D. $611,484

The total surplus brought forward from 1903 was $3,248,206; deducting the deficit for 1904, there was left a balance of $2,636,722. Last year only one quarterly dividend was paid, of 1.75 per cent on the preferred stock.

The president's report says: "Last year witnessed a depression in the iron and steel industry of unusual severity. In the early part of November, 1903, the price of steel declined $6 per ton, demand for iron and steel products diminished, and production was reduced nearly 40 per cent. At the end of the first half of the year general conditions were such that it was deemed prudent to adjust our inventory values, and $669,616 was written off, thereby reducing stocks of raw and finished materials to figures considerably less than those at which they could be replaced. On the other hand, cost of production increased, as the diminished demand prevented some of our works from operating full time, and entirely suspended operations at others, and an extremely severe and long winter further increased the cost of production by increasing cost of fuel, and the amount of labor required. At the beginning of March, however, the volume of business began to increase, and our operations have since been profitable. To-day the outlook is again very encouraging.

"The amount expended during the year for new construction was smaller than in any year since the organization of the company. This work consisted chiefly in the installation of new converters and a new 40-in. mill at our steel plant in Youngstown, and increasing the capacity of our furnaces, coking and mining plants at Birmingham. This new work was absolutely necessary to reduce the cost of production to the lowest possible point. All new construction work which was contracted for is now completed. By rigid economy and a general reduction of salaries, the fixed charges have been reduced as far as possible without bringing about the disorganization of an efficient working force.

"An interesting and perhaps important factor

in the future of the company may be found in its oil operations. At the time of the organization of the company, and later, it acquired gas and oil leases on 18,000 acres of land, for the purpose of supplying the Muncie mills with natural gas. As the gas pressure diminished, production of oil increased. The total oil production in 1903 was 35,107 bbl. In the first six months of 1904 it was 27,913 bbl.; in the month of September, 1904, it was 41,885 bbl. Present production averages over 1,400 bbl. per day. While it is too early to form a proper estimate of the value of our oil property, we feel justified in carrying on vigorous development work. We now have 71 producing wells, and are engaged in drilling 17 more.

"The company has recently completed its financial arrangements, which have been under negotiations for some time. The company will issue $10,000,000 first mortgage bonds, protected by a sinking fund, which will form the collateral security for a loan of $7,000,000 on its two and three-year notes. The bonds will be deposited for the benefit of those who purchase these notes, with the First Trust & Savings Bank, of Chicago, which institution is also trustee under the mortgage. A sufficient amount of these two and three-year notes has been sold already to take care of the company's floating indebtedness and to provide for all its present requirements. The balance will be placed when and as the company requires the money. There will be no public subscription. It has not yet been determined whether the bonds ultimately will be sold or the notes liquidated from the earnings of the company, which, with the revival of the steel business, promise to be large."

Anglo-Sicilian Sulphur Company.

This, popularly known as the sulphur trust of Sicily, is capitalized at $5,175,000, of which there has been issued $3,500,000 in 6 per cent preferred stock, and $175,000 in common, a total of $3,675,000, or 71 per cent of the stock authorized. In reality, this syndicate controls about 85 per cent of the production of brimstone in Sicily, and, calculating on this basis, the company's exports in the fiscal year ending July 31, 1904, amounted approximately to 428,930 tons. The gross profits on the year's trading have amounted to £182,075 ($910,375), to which must be added interest on temporary investments and other receipts, bringing the total to £187,909 ($939,545). After deducting working expenses and writing off a sum of £2,661 for depreciation in the guarantee and other investments, there remains a net profit of £158,428 ($792,140). Out of this, £42,000, less income tax, has been declared as a 6 per cent annual dividend on the preferred stock, and of the balance, 20 per cent, or £23,286, has been credited to the capital guarantee fund, which now amounts to £108,390 ($541,950). A further sum of £42,698 has been added to the reserve against any eventual depreciation of stocks of sulphur, which now amounts to £139,099 ($695,495). There has been added to the general reserve fund £25,000, making the total credit to this source £150,193 ($750,965), and this, with the capital guarantee fund as above, makes a reserve of £258,583 ($1,292,915).

The cash held on July 31, 1904, amounted to £173,455 ($867,275), and it is noted that advances have been made to producers in Sicily to the amount of £61,309 ($306,545). The stocks of sulphur are valued at cost of £813,800 ($4,069,000), less reserve of £96,401 ($482,005), against any depreciation, leaving £717,399 ($3,586,995) as the net valuation.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc. Preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

Ventilating a Tunnel.—In driving a tunnel, or adit, say 1,500 ft. long and 6.5 ft. square, it is desired to get the smoke from blasting out of the way, so as to begin work again in the shortest possible time, with due regard to the cost of fuel for driving a fan. In the case we have in view, the fan must be driven by a gasoline engine, where gasoline costs about 45c. per gallon at the mine. We would like very much to know whether it is best to use an exhaust fan, or a blower; what size pipe, too, should be used; what kind of pipe, and its weight—it should be as light as circumstances will permit; what size and type of fan should be used to handle the products of combustion, in not to exceed one hour's time, in the tunnel, the dimensions of which are given above? The item of power required is a very important one, as you can judge from the data given. We shall appreciate very much any information you can give us.—M. E.

Answer.—A distinguished mining engineer gives us the following answer to this question: "If the problem came up at our mines and all that was required was a rapid exhaustion of the products of explosion in a 1,500-ft. tunnel, I do not think that I should trouble with the question of fans or gasoline engines, unless it was intended for the final permanent ventilation of stopes as well as tunnel. Having in view the expertness of the average Mexican in the line of mason work, I should erect—near the mouth of the tunnel—a smokestack of sufficient area and sufficient height which would create, by the assistance of a very small fire at its base, draft enough to ventilate the tunnel thoroughly.

"As it is evident from the conditions quoted that the question of transportation of material to the tunnel is of importance, I should make the exhaust pipe of canvas, nailing the same over square strips and carrying this canvas box along one side of the tunnel—preferably, along the bottom; this box might be made 1 ft., or even 10 in. wide, with a height of 2.5 ft., which would give plenty of area, and still leave sufficient space for the car-track and cars to pass. I have often made these canvas boxes and used them for this purpose with considerable success; they are made in sections and nailed together with an outside strip of canvas with great ease. After they are completed, a coating of linseed oil, or any kind of paint, is all that is required to make them impervious. Their construction requires a minimum of lumber, and that lumber of very small size, such as is procurable everywhere and easy to transport. These boxes are connected with the ashpit at the base of the chimney, and, as a general rule, a few sticks of wood, or if that is not obtainable, a little gasoline burned in a jet at the base of the stack would give all the draft that would be required.

"Another arrangement which I have found equally satisfactory, if no water is available in the neighborhood, is the construction of a water-blower below the tunnel, the air suction of which is connected to the air-box.

"If your correspondents are determined to put in a fan, I should advise by all means the use of an exhaust fan, and not a blower; the reason for this being that with an exhaust fan all the smoke and fumes from the combustion are withdrawn from the tunnel within a few feet of the face, and consequently pure air is left through the balance of the tunnel. If they have a gasoline engine, and if lumber is available there, they could construct a wooden exhaust fan, covering the casing of it with well-painted canvas, which would have a large capacity and would save the freight on an iron one; but in this case a skilled mechanic would be required to run the engine, whereas, with the plain smokestack, practically no attendance at all is necessary."

Further remarks on this interesting subject appear in our editorial columns.

Oil Fuels for Gold- and Zinc-Slime Smelting.—I want reliable information regarding oil fuels for gold- and zinc-slime smelting. We need one furnace to take a No. 70 Salamander crucible, and one to take a No. 30. What quantity would be used to smelt, say, 1,200 oz. of retorted gold, starting all cold, and what time would be taken? Also, what would be the cost, size and shipping weight, with air and steam connections? What setting would be required, if any?—S. A.

Answer.—Salamander crucibles, we believe, are those made by the Morgan Crucible Company, and are seldom used in this country. We are not familiar with their sizes, but believe they are of about the same capacity as the American plumbago crucibles, and in the following data we have assumed this to be the case.

The F. W. Braun Company, of Los Angeles, Cal., in this country, has made a specialty of crucible furnaces using liquid or oil fuel, and has furnished the information given herewith. The No. 13 furnace, made by that company, with Cary burners, using gasoline, has, in practice, melted a 2,500-oz. bar in one hour, with a consumption of 2.5 gal. per hour. No. 12, a smaller size of the same furnace, will make a melt in the same time, but the quantity of gold would be only about one-half of that melted in a No. 13 furnace. These furnaces are used in a number of places in the West for smelting zinc-slime precipitate. If crude petroleum is used instead of gasoline, the Marvel burner, made by the same house, would have to be substituted for the Cary gasoline burner. With crude oil, the time required to make a melt is about one-half longer than with gasoline. That is, in a No. 13 furnace, it would take about 1.5 hours, against one hour with gasoline. The Marvel burner requires two tanks, one containing oil and the other water. In operation, the water circulates around in the face of the burner, and is there converted into steam, to atomize the oil, and thus give a clear flame.

These furnaces require no setting. The No. 12 furnace has a crucible compartment 12 in. wide and 15 in. deep; its outside size is 18 by 24 in. and 18.5 in. high. The shipping weight is 325 lb., and the price quoted is $25. No. 13 is larger, the shipping weight being 450 lb.; the price quoted is $40. The Marvel crude oil burner costs $15, in addition to which there are the tanks and connections, ranging from $22 to $50, according to size desired.

We may add that assay and melting furnaces using liquid fuel are now being largely used in this country, and are generally approved in practice.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

CONSTRUCTION OF LEASE AS TO ASPHALTUM LANDS.—Where a lease of asphaltum land provided for a renewal concurrently on the payment by the lessees of a sum equal to the difference between the royalty paid and that which would be payable on a specified number of tons of asphalt, and the lessor wrongfully refused to make such renewals, the lessees or their assignors were at liberty either to tender such differential rent and insist on specific performance of the covenant to renew, or refuse payment, and treat the contract at an end, and the lessor could not recover the differential payment.—Warner vs. Cochrane, (128 *Federal Reporter*, 553); Circuit Court of Appeals of the United States.

SUFFICIENCY OF NOTICE UNDER LAW OF CALIFORNIA.—The law of California, Statutes 1875-6, page 853, c. 562, relative to the recording of mining locations in Calaveras county, provided that a copy of the notice of location should be recorded within six days from the date of posting, and that a notice posted without being recorded should not be considered notice to subsequent locators. A description of a location omitted the last course and distance; describing the next to the last distance, as running to the place of beginning, instead of to the last monument. In a subsequent action to quiet title, it appeared that a straight line from the next to the last monument to the place of beginning would include all the land in controversy, and that if the course and distance last given in the recorded description were followed it would reach the monument described, from which a straight line to the place of beginning furnished an exact description. It was held to be sufficient under the statute.—Mitchell vs. Hutchinson (76 *Pacific Reporter*, 55); Supreme Court of California.

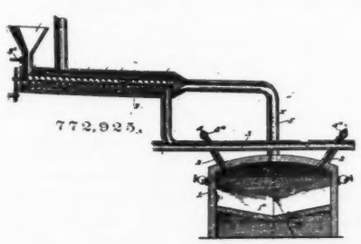
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

Week Ending October 25, 1904.

772,925. ROASTING AND SMELTING FURNACE.—Harvey Cockell and William H. Fish, Columbus, Ohio. In an ore roasting and smelting apparatus, a furnace, an outlet for the products of combustion therefrom, an ore feeding and roasting chamber located in s



outlet having a separate discharge into said furnace, and a fuel-supply communicating with said discharge.

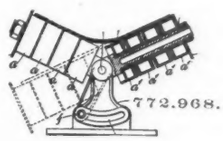
772,911. COAL-STORAGE PLANT.—Alfred M. Acklin, Pittsburg, Pa., assignor to Heyl & Patterson, Pittsburg, Pa. In a coal, or like, storage plant, a suitable platform having a discharge-outlet, a vertically-movable frame supported above said platform, and a traveling scraper on said frame adapted to travel to and from said outlet.

772,955. RUBBER FOR SURFACING STONE, MARBLE, ETC.—Alexander M. I. McLeod, Quincy, Mass. In a rubber, a back plate, having a series of grooves in the face thereof, and suitable rubbing members retained at one end in said grooves.

772,956. COAL-STORAGE PLANT.—William J. Patterson, Pittsburg, Pa. In a coal, or like, storage plant, the combination of a suitable platform having a discharge-outlet, at or adjacent to, the center thereof, a frame supported above said platform, a carriage on said frame adapted to move to and from said outlet, and a vertically-movable scraper on said carriage.

772,957. COAL-STORAGE PLANT.—William J. Patterson, Pittsburg, Pa. In a coal, or like, storage plant, the combination of a suitable circular storage-platform, a stationary hopper supported above said platform at or adjacent to the center thereof, a horizontally-arranged endless conveyer in proper position with reference to the outlet of said hopper, said conveyer extending to the outer edge of said platform, and mechanism for lifting the coal from said platform and discharging the same into said hopper.

772,968. SUPPORT FOR CONVEYER-BELTS.—William R. Smith, Buffalo, N. Y., assignor of one-half to Harrison D. Folinsbee, Buffalo, N. Y. In combination, a series of pulleys, and means for holding said pulleys in the form of a support which is depressed at



its center and raised at its ends, to give a belt running over the pulleys a trough shape in cross-section, said means being adjustable to permit the depression of one or both ends of the support and the corresponding edge or edges of the belt, the construction being such as to enable the support to be set at an angle that will permit a rapid discharge by gravitation from said belt.

772,989. CENTRIFUGAL PUMP.—Irvin C. Williams, Johnsonburg, Pa., assignor of one-half to John Alexander Craig, Johnsonburg, Pa. In a centrifugal pump, an adjustable pump-casing having a central inlet and a pair of outlets, the outlets being disposed tangent to the periphery of the casing at opposite sides thereof and extending outward in parallel directions, and a piston mounted for rotation within said casing and comprising a plurality of radially-arranged fusiform wings having their ends disposed in close proximity to the inner surface of said casing and a rigid web connecting said wings at the back.

773,004. ARTIFICIAL FUEL.—James M. Dennis, Richmond, Ind., assignor of three-eighths to Harry R. Dennis and William H. Alford, Richmond, Ind. An artificial fuel composed of organic humus, virgin earth, magnesium sulphate, Glauber salt, sodium chloride, iron sulphate, solidified petroleum, black oxide of manganese, saltpetre and lime.

773,012. PROCESS OF MAKING STEEL WIRE.—James A. Horton, Providence, R. I., assignor to Iroquois Machine Company, New York, N. Y. An improvement in the art of producing wire by subjecting the same to a plurality of wire-drawing operations in a continuous process, consisting in subjecting the wire to heat at a drawing-station by die action raised to a speed sufficient to heat the wire up to a point overcoming crystalline action, drawing the wire so heated directly into a cooling medium and thereby reducing the temperature to bring the wire to a condition of stability suitable for subjection to a subsequent drawing operation.

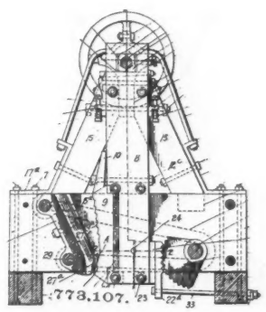
773,029. MACHINE FOR HYDRATING LIME.—James Reaney, Jr., Sherwood, Md. The combination of an outer imperforate cylinder; an inner perforated screen tapering in a direction toward its discharge end; a water-supply pipe at the higher end of said tapering screen, and a steam-pipe also within said tapering screen.

773,030. PROCESS OF CONVERTING QUICKLIME INTO POWDERED HYDRATED LIME.—James Reaney, Jr., Sherwood, Md. A process of hydrating lime consisting of taking a given quantity of quicklime, tumbling, wetting and simultaneously therewith sifting same to immediately remove the hydrated particles and subjecting the remaining unhydrated particles to the action of steam and continuing the tumbling and sifting to complete the hydration of said remaining particles.

773,034. PROCESS OF TREATING STEEL.—Theodore G. Selleck, Chicago, Ill., assignor to Acme Steel Company, Chicago, Ill. A process of converting steel, which comprises surrounding low-carbon steel with a carbonizing compound and packing the charge so formed with a removable package, conveying said package to a converting zone, and then removing the package from the charge contained therein while the charge is in the converting zone.

773,099. MACHINE FOR MOLDING CONCRETE BLOCKS.—Thomas Podmore, Wilkes-Barre, Pa. In a molding-machine, the combination of a vertically-movable bottomless mold, a support therefor, a bottom plate for the mold, movable therein, means to move said bottom plate and to support the same against movement, and means to raise the mold from and to drop the same upon its support.

773,107 ROCK CRUSHER.—Charles Wallace, Denver, Colo. The combination with a suitable frame and an operating-shaft, of a lever-bar connected with



the shaft, the latter being connected to impart to the bar an eccentric or crank action, a block pivotally attached to the lower extremity of the lever-bar, a breakable safety-pin, against which said block bears, and an abutment engaging the block and forming a fulcrum for the lever.

773,112. ROCK-DRILL.—Thomas E. Adams Cleveland, Ohio, assignor to the Adams Drill Company, Cleveland, Ohio. The combination with a wagon, a drill and an arm pivotally connected to the wagon and to the drill, of an engine adjustably mounted on said wagon and adjustable means for transmitting motion from the engine to said drill.

773,137. MACHINE FOR MOLDING CEMENT BLOCKS.—Zachariah Fielder, Hannibal, Mo. The combination with a track, of a plurality of mold-boxes arranged between the rails of said track, a carriage mounted for travel on the track and comprising an open-ended frame, a plunger mounted for vertical movement on said frame, a pair of screws engaging the plunger, pinions carried by said screws, and a gear-wheel meshing with said pinions for reciprocating the plunger.

773,143. GAS-PRODUCER.—James A. Herrick, Philadelphia, Pa. In a gas-producer, a producer-body having a lid comprising a grating and bricks seated in said grating, said bricks extending beyond the inner face of said grating.

773,194. APPARATUS FOR TRANSFERRING COAL OR OTHER MATERIAL.—Jeremiah Campbell, Newton, Mass. In an apparatus for transferring coal or other material, devices such as a truck and a carrier tower or support mounted upon the truck, means for varying the level of the truck and tower or support, upon which they are horizontally movable, and a bridge or extension carried by said means and affording a device by which the truck and carrier tower or support may be moved horizontally from said means, in combination with means located beyond the farther side of the bridge from said level-varying truck-support whereby said tower may be supported while in action.

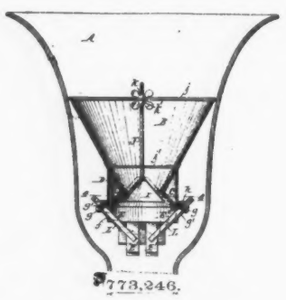
773,203. BLOWPIPE.—Eugene H. Fosdick, Los Angeles, Cal. A flat support provided with means for feeding combustible material, a flat nozzle-carrier mounted on the support and provided with a plurality of nozzles, mechanism for causing said feeding means and either one of the nozzles to register, and a base for adjustably holding said support and carrier.

773,210 CONVEYER.—William C. Mackellar and Thomson Mackenzie, Greenock, Scotland. In combination with a body for supporting the material, inclines upon which the body is supported and means for reciprocating the body longitudinally over the said inclines, said inclines being rigid and sloping toward opposite ends of the body.

773,219. HOISTING APPARATUS.—Almon E. Norris Cambridge, Mass. In a hoisting mechanism, a shaft having a friction member fixed thereto and a friction-drum loose thereon, a collar fast to the shaft, a non-rotating collar loose on said shaft and engaging said fast collar, a thrust-collar between said non-rotating collar and drum, a screw in one of said last-named collars and operating against the other, and means to turn said screw.

773,221. SLIME-WASHER.—Lewis E. Porter, Camp Rochester, Cal. A tank for containing the charge, a pervious material around the upper edge of the tank, and a rotary distributer in the tank.

773,246. MAGNETIC SEPARATOR.—John W. Carnoghan, Silver Creek, N. Y., assignor of one-half to Albert B. Chapman, Silver Creek, N. Y. The combi-



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nation with a downwardly-tapering mill-hopper, of a magnetic separator comprising a downwardly-tapering funnel which is seated loosely in the mill-hopper, and separating magnets supported on the funnel at the outlet thereof.

773,257. ROLLING-MILL TABLE.—Sigmund V. Huber, Pittsburg, Pa. An apparatus for rolling-mills having in combination a receiving-table, reciprocating dogs for shifting the article across the receiving-table, a storage-table, two or more slides, each provided with a series of two or more dogs and mechanism for reciprocating the several dogs whereby an article is shifted from the receiving to the storage table and moves step by step across the latter.

773,266. AMALGAMATING-MACHINE.—Gerard C. Scott, Columbus, Ohio. The combination of a substantially horizontal tapered mercury-containing casing closed at its larger end and open at its smaller end with an inlet for its larger end, a steam-jacket for the lower portion of the casing, a longitudinal substantially horizontal shaft journaled within the casing, and a closed amalgamating body, carried axially upon the shaft, tapered with the casing and provided with longitudinal substantially radial blades, means for rotating said amalgamating-body and an inclined tailing-discharge chute located adjacent to the smaller end of said tapered amalgamating-body, and forming a continuation of the tapered casing.

773,281. CONTAINER FOR RADIUM AND ALLIED COMPOUNDS.—Willis E. Everette, Tacoma, Wash. A container for radium and allied compounds which consists of an insoluble body of gelatinous chromate of ammonia, containing sodium chloride.

773,310. MINING-MACHINE.—William O. Wood and John H. Miller, South Hetton, England. A mining-machine comprising a stationary principal frame, a sliding frame supported in guides upon the principal frame, means for supplying motive power, means for cutting and a drill, said means and said drill being all mounted on said sliding frame, a drill-spindle, bearings for said drill-spindle adapted to swivel and to be adjusted to any position, a semicircular guideway and means for clamping said bearing in position in said guideway and a swiveling steadying-block upon the stationary frame for the drill also adapted to be pivotally adjusted to any desired position.

773,316. ROTARY-PUMP.—Edwin W. Evans Philadelphia, Pa., assignor of one-half to Spencer K. Lewis, Philadelphia, Pa. A rotary pump comprising a plurality of convoluted conduit-sections, a mouth on one of said sections, check-valves between said sections, an axial discharge and means connecting the convoluted portion farthest from said mouth with said axial discharge.

773,343. PROCESS OF MAKING PURE SALT.—Otto Sachse, Lüneburg, Germany, assignor to the firm of Triplex, Gesellschaft für Soole-Verdampfung im Vacuum M. B. H., Lüneburg, Germany. A process of manufacturing pure common salt, from brine containing salts of lime and of magnesium, which consists in eliminating the difficultly-soluble salts of lime and, at the same time, leaving the magnesium salts in unaltered condition and eliminating not more than a small part thereof, evaporating the purified brine *in vacuo*, and removing the soluble by-salts contained in the salt.

773,356. APPARATUS FOR COATING NAILS.—Charles Waggoner, Kokomo, Ind. The combination of a base, a support to which one end of the base is hinged, means for adjustably supporting the other end of the base, a revoluble drum mounted on the base, means for driving the drum, the drum being open at each end, a feed device at one end of the drum, a gate at the other end, said gate being mounted on the base, and an operating-lever fulcrumed upon the base and pivotally connected with the gate.

773,368. SUBSTITUTE FOR LITHOGRAPHIC STONES AND METHOD OF MAKING SAME.—George Bower, St. Neots, and Frederick W. Gauntlett, London, England. A method of manufacturing a substitute for lithographic stones which consists in forming a metallic plate with a coating of oxide of metal to form a printing-surface by the subjecting of said plate in an oxidizing atmosphere to the application of heat.

773,375. CONCRETE-MIXING MACHINE.—Richard H. L. Cooper, St. Louis, Mo. In a concrete-mixing machine: suitable sills; posts mounted vertically upon the sills in the form of a square, braces connecting the upper ends of the posts; a floor resting upon said braces and having a feed-opening; bearing-rollers mounted upon the sills and upon the posts, so as to support the ends of the mixer; mixer-heads comprising vertical circular plates, funnel-shaped walls, and flanges; with feeding apparatus.

773,421. ARTIFICIAL STONE.—Ernest D. Reed, Ann Arbor, Mich., assignor to Royal S. Copeland, trustee, Ann Arbor, Mich. A composition of matter consisting of sand, cement and lime moistened with a neutralized mixture of water, copperas, copper sulphate, chromic alum, manganese chloride, litharge, potassium carbonate, sodium silicate, calcium fluoride and sulphuric acid.

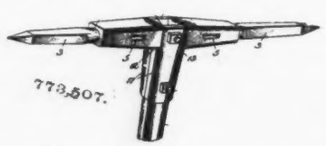
773,450. PROCESS OF MAKING ALLOYS.—Robert S. Anderson, Seattle, Wash., assignor of three-fourths to Walter F. Horner, Willis C. Meeker and Hiram U. Woodin. A process of producing an alloy which consists in mixing copper and tin and heating the same until they are brought into a molten mass and then adding copper sulphate and finally adding aluminum.

773,452. CONVEYER.—Marselius T. Ash, Chicago, Ill. In a conveyer mechanism, the combination of two belts, means for driving said belts, means for adjusting said belts relatively to each other, and means operatively connected with the belts respectively for actuating said adjusting means when one belt gets in advance of the other.

773,494. COMPOSITION OF MATTER PURIFYING SEA OR HARD WATER.—Adolf Gutensohn, Southend, England. A composition of matter for treating impure water, consisting of resin prepared by repeated heating and cooling dissolved in a solution containing common soda, caustic soda and silicate of soda.

773,501. SYSTEM OF PUMPING OIL.—Ross J. Hoffman and Edward H. Hollingshead, Bradford, Pa. In combination, with the casing of an oil-well, a stand-pipe and its connections within said casing, a compressed-air engine mounted directly upon and supported by the stand-pipe with its piston-rod actually in line with the stand-pipe, and connected to the sucker-rod, a compressed-air-supply pipe, and means whereby the compressed air operates the piston positively in both directions.

773,507. PICK.—Bud H. Laughhunn, Centralia, Ill. The combination of a tool-head provided at its side faces with recesses and having a socket extending



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upwardly from its lower face and terminating short of its upper face, a handle fitted in the said socket, a combined clamp and brace composed of sections arranged at the side faces of the head and the handle.

773,524. COATED NAIL.—William S. Rogers, Cleveland, Ohio, assignor to J. C. Pearson Company, Boston, Mass. A nail coated with a composition consisting substantially of rosin and a proportionately small quantity of a non-drying oil.

773,529. METHOD OF CARBON ANALYSIS.—George O. Seward, Holcombs Rock, Va., assignor to Eimer & Amend, New York, N. Y. A method of determining the amount of carbon contained in a substance consisting in mixing the said substance with an oxidizing agent, and confining said mixture, causing an electric arc to raise a portion of the mixture to a kindling temperature, causing carbon dioxide formed by the reaction to pass through potassium hydroxide or other absorbing agent, thereby collecting the said carbon dioxide, covering the residual mixture with diluted sulphuric acid, boiling the said acid and then causing purified air to pass over the surface of and through the sulphuric acid containing the said residual mixture, and over the said potassium hydroxide and weighing the said potassium hydroxide.

Reissue No. 12,279. DOOR-OPERATING GEAR FOR COAL OR COKE CARS.—William F. Kiesel, Jr., Altoona, Pa. Original No. 726,541 dated April 28, 1903. The combination, with the chutes and hinged doors, of a shaft passing along beneath the chutes at ach side of the car, toggle-arms on said shafts at each side of the doors, links coupling said arms to trunnions projecting from the sides of the doors, a central operating-shaft, a worm on said shaft in line with a pair of oppositely-disposed sheaves on the side shafts, chains or cables passing from the worm to said sheaves one of said chains being run off the worm as the other is wound thereon by the rotation of the operating-shaft in either direction, whereby motion is imparted to one or the other of said shafts, a second pair of oppositely-disposed sheaves on the side shaft, a chain or cable passing from one of said sheaves to the other, whereby motion in one of the side shafts is imparted to the other, and means for turning the operating-shaft in either direction.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending October 8, 1904.

12,727 of 1903. EXTRACTING VANADIUM.—P. Auchinachie, Wrexham. Extracting vanadium by digesting the ore in acid, electrically depositing oxide, and then smelting in electric furnace.

18,956 of 1903. ROCK DRILL.—W. C. Johnson and G. C. Pearson, London. Improved mechanism for giving percussive motion to rock drills.

19,226 of 1903. JIG.—S. Deutsch, Hungary. In jigs, making the parts more readily adjustable for varying qualities and sizes of ores treated.

22,971 of 1903. CONICAL SCREEN.—W. H. F. Maddison, Darlington. In trommels, the provision of a conical screen at the entrance, which rejects all pieces over a certain size.

24,724 of 1903. WATER-JACKET ROCK DRILLS.—Siemens & Halske, Berlin, Germany. Improved method of water-jacketing rock drills, with the object of keeping down the temperature.

17,183 of 1904. FEEDER FOR STAMP MILLS.—C. F. Strauss, Kalgoorlie, Western Australia. Improved automatic feeder for stamp mills.

Week Ending October 15, 1904.

19,353 of 1903. ROASTING FURNACE.—I. Sanfilippo, Sicily. Ore roasting furnaces having numerous pillars for introducing air throughout the furnace.

24,394 of 1903. CRUSHER.—R. V. Hadfield and A. G. M. Jack, Sheffield. Method of seating the mantles of gyratory crushers by means of a bed of spelter.

7,309 of 1904. PRECIPITATING METALS.—P. & A. Weiller, Vienna, Austria. A modification of the process for precipitating metals from acid solutions by sulphuretted hydrogen, the heat being given by iron-filings and the oxidizing medium by means of saltpetre.

8,216 of 1904. ELECTRIC FURNACE.—G. Gin, Paris, France. An improved electric furnace for refining steel, using steel electrodes, and making the reservoir of metal sinuous in shape so as to develop enough heat without using the resistance of the slag.

16,449 of 1904. PULVERIZING METALS.—L. F. Huguenot, Paris, France. Pulverizing metals by spraying them by help of jets of air or steam into a cone-shaped chamber.

17,561 of 1904. MAKING ZINC SHAVINGS.—W. K. Betty, Johannesburg, Transvaal. An improved tool for producing zinc shavings rapidly, for use in cyanide precipitation.

SPECIAL CORRESPONDENCE

San Francisco. Oct. 26.

The Los Angeles minority stockholders of the California King Gold Mines Co., of New York, have issued a pamphlet in which certain charges are made against those in control of operations. The other side of the case is yet to be heard.

At the time of the delinquent sale of the stock of the White Swan Mines Co., Ltd., 216,680 shares standing in the name of Letson Balliet, for himself and as trustee, were sold, as well as 350,000 shares in the names of other people, making a total of 556,000 shares out of the entire issue of 1,250,000 shares. The present directors sued to cancel many thousands of shares which Balliet caused to be issued to himself and his wife just before resigning as president and manager for the company. He resigned because he had been indicted in Iowa for using the mails for fraudulent purposes, and it was impossible to raise money to pay the company's debts while he was in control, his mail being marked as fraudulent by the government. Balliet, finding that he could not control the new board of directors, issued circulars trying to get proxies to obtain control himself, so as to prevent an assessment on the stock, large quantities of which he held. In this he was unsuccessful, and the directors levied the assessment. He then advised stockholders not to pay it, but the delinquent stock was sold according to California laws. In the suit brought by the present directors to cancel the stock held by Balliet, much interesting testimony has been brought out, including letters of Balliet showing his plans to again obtain control of the mine. The mine is in Oregon, but the company was incorporated under the laws of California; hence the proceedings in the courts of this State. Balliet advertised himself as the "Napoleon of Finance," etc., and succeeded in getting large sums of money from people who made "investments" in the White Swan company.

A suit has been begun to compel the transfer of 150,000 shares of stock in the McAlpine Mining Co. by E. B. Burdick, who claims that the stock is due him under a contract for finding a purchaser for the mine in Tuolumne county, at a price of $50,000. The suit is by Burdick against F. R. Whitcomb, F. W. McLean and the Joaquin Oil & Mining Co. When the mine was sold Whitcomb was given 276,000 shares, part of which Burdick now claims.

L. M. Hall, consulting engineer and superintendent of the Comstock Pumping Association, in an official report, states that the actual work of draining the middle group of mines on the Comstock lode, Nevada, will begin early in November. This is preparatory to exploiting bodies of ore known to exist in the long submerged lower levels, and searching for new orebodies at great depth. For the first few hundred feet the water is to be lifted from the shaft by compressed air. The column pipes for the air-lift are now ready. From the 1,800-ft. level down, the drainage will be by bailing tanks or pump, as conditions dictate. The work of retimbering will proceed as the water goes down. The Ward shaft, 2,500 ft. deep, is to be sunk to 3,000 ft., and at the bottom two electrically driven pumps are to be installed. Explorations through the north and south will be made from the 3,000-ft. level, which will open up entirely new ground. Bids for the new pumping plant have been called for. The water in the C. & C. shaft will also be lowered to the 2,500-ft. level, which will open much promising ground for exploration. At the south end of the Comstock the Alta shaft is being repaired by the Gold Hill company, and eventually will be used to facilitate the drainage of the lower levels of the entire group of Gold Hill mines. With the three pumping systems, one each at the C. & C. Ward shafts, and one at the Gold Hill shaft, deep mining on the Comstock will be begun in earnest.

The big power plant in Tuolumne county has been set running again, and many large mills, "hung up" entirely or partly for some months for lack of power, have since started. Operations throughout the foothill and mountain sections are now being conducted on full time.

A Mr. De Lancie has brought suit against Butte county to recover $582 paid under protest, and due to the sudden raising of assessments of lands valuable for dredging for gold. A petition was presented some months since to open an avenue through the De Lancie land, and a portion of the land being dredged by the Central Dredging Co. De Lancie protested against the opening of the avenue, but the petitioners offered to raise the money for it. When the board sought to obtain evidence on which to fix valuation, the dredger men swore the land was worth $3,000 per acre, making the strip of land wanted worth about $5,000. This sum was too great to raise. But the supervisors, on the showing made, raised the assessments. De Lancie's land, which had been placed at $4,650, was raised to $28,000, and the Gardella tract from $10,435 to $90,000. De Lancie and Gardella paid taxes under protest, alleging the increase was illegal. The dredger men are rather exercised on this subject, since they object to paying high rates on land of no value until mined, and the supervisors contend that the land is of no value whatever after it is mined.

Amador is the latest county to have available dredging lands. Land about four miles up Sutter creek is being examined. The American Dredging Co. is also examining land fit for dredge purposes along the Cosumnes river at Forest Home. Thus far no active steps have been taken to test the ground with drills.

CHAS. G. YALE.

Denver. Oct. 29.

As the Golden Cycle Mining Co., which is being sued by the Theresa Gold Mining Co. for $250,000 damages, is incorporated under the laws of Virginia, the apex suit has been removed from the State court to the United States Circuit Court.

In the Court of Appeals, the controversy between the county commissioners of Teller county and a number of mines, on account of their being assessed for taxes, is now being tried. The owners of the Pilgrim Consolidated, the Heart Gold Mining & Leasing Co. and the Moon-Anchor, had been beaten in court by the commissioners and appealed to the Supreme Court, which decided that it did not have jurisdiction, as no constitutional point had been raised. The companies refused to pay the assessed taxes on account of their properties being non-producing.

It is generally understood that the Supreme Court of the United States will again take up the Hull iCty placer case, which has been in the courts for several years. Recently an order was issued by the Department of Justice and by the Department of the Interior, which allowed copies to be made of all the records and the correspondence in this celebrated case. It is being watched with a great deal of interest, as the ground involved, which is claimed to have been patented by fraudulent means, is extremely valuable, and has already produced an enormous amount of gold.

The State Investment Co., of this city, recently secured a judgment of about $24,000 against the Extension Gold Mining Co. in the Denver District Court, and on October 29 Sheriff Bell will sell the Jefferson claim of that company to satisfy the same. It adjoins the Strong mine and is in an excellent location.

A remarkable shipment of rich ore was made this week to the smelter by the El Paso Consolidated Mining Co., of Cripple Creek. A little less than one and one-half tons netted $76,150, showing it to be the richest shipment in quantity ever sent from the district.

All of the 27 lessees at Stratton's Independence are at present shipping ore, and during the month of September 126 car-loads were produced. In the 400-ft. level also the company is taking out a good grade of ore.

A car-load of tungsten ore reached Denver this week from the Graham lease, at Nederland, Boulder county. This vicinity is beginning to show up well in the production of tungsten, which has been discovered in large bodies.

A few miles west of this city the National Dredging Co. has been building two dredges. On October 28 the first boat was put in operation. In a short time the second one is expected to start up.

Mr. Henry M. Blackmer, of Colorado Springs, president of the Cripple Creek Central railroad, which was formerly known as the Denver & Southwestern, denies the published report that the Colorado Springs short line will absorb the road.

It is hoped here that the suit brought in New York to restrain the issue of $45,000,000 in bonds of the Colorado Fuel & Iron Co. will not interfere with the large improvements planned for the Minnequa plant.

The Independent smelter, at Golden, has begun operations after an idleness of more than a year. The present company purchased the smelter a few months ago, remodeled it, and will start with a capacity of about 300 tons daily, having about 5,000 tons of ore on hand and a number of contracts with mines in different districts. Mr. R. G. Walter has been appointed superintendent.

A report has been received in this city of a terrible explosion of coal dust at the Tercio mine, near Trinidad, of the Colorado Fuel & Iron Co., by which a large number of miners have lost their lives.

Houghton. Oct. 28.

The Mass mine has resumed operations in shaft C, the most southwesterly opening of the property, and the working force has been increased 100 men thereby. Shaft C is 2,500 ft. from shaft B, the nearest surface opening, and is not connected with any other part of the property by underground openings. The nearest railroad connections are also at shaft B. It is sunk on the Butler lode, one of the seven parallel cupriferous formations traversing that section. The shaft is 435 ft. deep, and has drifts extending at some levels about 500 ft. Work was discontinued at shaft C 18 months ago, at which time there was a general cessation of exploratory work throughout the Mass. Since that time operations have been confined to shafts A and B, from which rock shipments averaging 500 tons daily have been maintained, and development has been prosecuted in the more promising parts of the property. It is stated that the Mass has been making a little money since its retrenchment. It is suggested, but not verified, that an assessment will be necessary if the resumption at Shaft C is maintained, as it cannot be a profitable shipper for a long time.

The Victoria mine is now nearing the completion of its 315-ft. shaft in the sandstone, which is being sunk as a part of its hydraulic air compressor. This shaft is 20 by 20 ft., and is sunk at an angle of 80 degrees from the horizontal. It will be used as the channel of egress for the water, which will flow into three vertical cylindrical shafts, and which will entrain the air and compress it in the downward course. The compressed air will be trapped in a large chamber stoped out above the tunnel connecting the three inlet shafts with the 20 by 20 ft. outlet shaft, and from this chamber it will be piped to the points of consumption throughout the property. All power at the mine and mill, including the hoisting and the stamping, is to be supplied by compressed air. The three cylindrical inlet shafts are each to be 5 ft. in diameter and are to be drilled by a specially constructed bit. Preliminary drill holes 5 in. in diameter have already been sunk in the line of the proposed shafts, and to the full depth. A tunnel will connect the preliminary 5-in. holes with the outlet shaft, and when the drilling of the 5-ft. shafts is in progress the sludge will be discharged through the 5-in. holes and hoisted through the outlet shaft. The preliminary drill holes will also serve to guide the fore-bit of the 5-ft. drill in its course. Underground work has been discontinued at the Victoria, and will so remain until the hydraulic compressor is ready for service, probably next spring. A permanent two-skip conical-drum hoisting engine is on the ground, and the ore mine shaft which the Victoria has opened is being prepared for the installation of large capacity skips, preliminary to regular production. No stopes have yet been started in the Victoria, but the mine has been extensively opened by drifts, and it is officially stated that a supply of copper rock is in sight to keep the mill in operation at the rate of 300 tons a day for five years. A single stamp head has been purchased from the Belt mine, which is idle, and delivered to the Victoria's railroad siding, five miles from the Victoria mine. It will be hauled to the mine on the snow during the winter.

Secretary William R. Todd and Director Isaac H. Meserve, of the Adventure mine, visited the property this week. They report a very favorable change in the conditions underground. The drift from No. 3 shaft at the eighth level, which is extending away from the disturbed formation beneath the rugged Adventure bluff and out under level ground, is getting into a more regular formation, and the showing of copper is constantly improving. The last 50 ft. have been through particularly good ground. It is planned to increase the rock output at an early date, keeping one head in the mill operating 24 hours a day, instead of 12 hours, as at present.

The St. Mary's Mineral Land Co., which is sinking for exploratory purposes on Section 22, south of the Champion mine, put its sand shaft down through 56 ft. of overburden during the first month of operations. The depth of the overburden is not known positively, but it is estimated at about 150 ft. The property will be known as the Challenge. What is supposed to be the Baltic lode has been located on Section 22 by means of the diamond drill.

The southerly drifts in the Champion mine are disclosing the best copper ground of the property. The third and fourth levels have each been carried 1,300 ft. to the south of shaft E, which is the most southerly surface opening on the property, and are breasted in the best ground of the mine. A winze connects the levels near this point and discloses excellent copper ground for the entire lift. The distance from shaft E to the southern boundary of the Champion property is 3,900 ft. It is probable that this entire territory will be developed by only one additional shaft, and that power tramming, either by compressed air or electricity, will be adopted. The distance from shaft B, the most northerly surface opening on the Champion, to the northern boundary is 1,850 ft., and since the vertical plane of the boundary brings this line in towards the shaft with depth, making the length of the respective lower levels constantly shorter, it is doubtful if another shaft will be opened there. Such a shaft, to be called shaft A, was planned in the original layout of the mine, but this did not contemplate power tramming.

ARTHUR L. CARNAHAN.

Butte. Oct. 28.

The Pittsburg & Montana Copper Co. is preparing to operate on an extensive scale. It has received machinery for a new converting furnace, and will begin putting it in place in the smelter as soon as Manager Baggaley returns from the East, which will likely be next week. Development in the mines is progressing rapidly. The 2600-ft. crosscut, which is being driven between shafts 2 and 3 at a depth of 1200 ft., is nearing completion and will be finished early in November. The work so far has demonstrated that the large copper-silver ore veins of the Amalgamated cross the flat east. Several of these veins have been intersected by the crosscut. Two are wide and the ore good. It is not known how soon the company will be ready to start its smelter.

F. W. Link & Co. are building a cyanide plant a short distance from the Lexington mill, and will have it in operation next week. The plant will contain eleven tanks, having a capacity of 25 tons each. It is to be operated on tailing from the Lexington mill, which was deposited in the gulch below the mill years ago. Mr. Link is thoroughly conversant with the process of cyaniding, having had experience in South Africa and other parts of the world. The plant, when finished, will be the only one of its class in Silver Bow county.

The Amalgamated is now employing in its mines and smelters of Butte 6,600 men, and the United Copper 1,000. Both are operating their mines and plants full blast. F. A. Heinze, manager for the latter, has secured a lease and option on the larger portion of the property of the Lexington company, and is preparing to unwater the workings of the mines, his object being to relieve the pressure in the east workings in order to enable him to follow the vein of his Cora mine without danger of flooding the workings of that mine. The option covers a period of eighteen months. All ore taken from the property during its life is to be shipped in the name of Louis Girard of Paris, who owns the mines and mill, and the proceeds are to be applied on the purchase price, which has not been made public. The lease was obtained by Adolph Victor, of New York.

Reins Copper Co. will be in shape next week to resume the extraction of ore from its Combination mine. It is installing a large pump on the 800-ft. level. This company, after overcoming many obstacles, recently struck a 7-ft. vein of copper-silver ore in the east drift on the 800, but the flow of water was too great for its pumps. Its mine is located in the copper belt east of Butte. Two shipments of ore made before work in the level was stopped netted $1,800.

Experts are working on the zinciferous ores of the Alice company with a view of discovering a process by which the zinc, gold and silver can be separated and saved. They are using ten stamps of the 60-stamp mill and other devices, but have not succeeded in accomplishing the desired result. There are millions of tons of this class of ore in the Butte district.

Salt Lake City. Oct. 28.

The Stockton mine and mill, at Stockton, are to be lighted by electricity. A plant was purchased during the week and is to be installed at once. The generator, in addition to supplying the energy for 90 incandescent lamps, will furnish power for the concentrating tables in the mill. The latter is nearing completion and will go into commission about November 12.

Suit has been brought in the district court by C. J. O. Irwin against the Superior-Alta Mining Co. to quiet title to the area in conflict between the Alta and Alta No. 2 lode claims, owned by the plaintiff, and the Alfred and Huron lodes, owned by the defendant, in the Big Cottonwood mining district.

An important decision has been handed down by the Supreme Court of Utah, which involves the right of a mining company to build an aerial tramway across the property of another. The case is entitled Highland Boy Smelting Co. vs. John Strikley et al., and the trial in the lower court resulted in a verdict in favor of the plaintiff, which was affirmed by the supreme court. The defendants owned two placer mining claims. The plaintiff built a tramway over it, which the plaintiff sought to condemn the right of way. The court contended that the company could not be prevented from building across the land or, after it was built, to remove the tramway, but that the company, at its own expense, would be required to move the towers supporting the tramway as often as Strickley et al. might request, when necessary to have the towers changed so that Strickley could operate his mine.

The plaintiff based its right to condemn upon an act of the legislature, granting the right of eminent domain for public use of tramways to facilitate the mining, smelting and reduction of ores. The appeal was made by Strickley's attorneys on the ground that the tramway was not for public use, therefore the right of public domain could not be exercised. The supreme court held that property can be condemned for the construction of ditches by the right of eminent domain; and as the mining interests of Utah are only second to the agricultural in importance, and the erection of a tram is for public use, the court has power to condemn the land over which the tramway runs. The opinion concludes:

"Since it is of vital importance to the people that the coal, as well as other hidden resources, of the State be opened up and developed, and that the mining industry in general, which has been the source of so much wealth to the people of this and other western States, be conducted on the same extensive scale in the future that has characterized its operations in the past, it is, therefore, the public policy of the State, as exemplified by the Act of the legislature under consideration, to encourage the people to open up and exploit the mines with which the State abounds, and thereby not only give to the State the wealth which will enable other industries to be created, but to furnish thousands of laborers with remunerative employment.

"Therefore, the same line of reasoning that applies in the matter of irrigation ditches—Nash vs. Clark—applies in connection with the mining industry.

"Therefore, it is decided that the Act of the Legislature under consideration makes ample provision for the payment of a fair price to the owner of lands sought to be condemned, and for all damages that he may suffer because of such taking, and is, therefore, valid."

The stockholders of the West Mountain Placer Mining Co. were paid a dividend of two cents a share during the present week, aggregating on the issued stock the sum of $2,483. This is probably the only mining company in the world that is not doing any mining of precious metals, yet it is able to pay dividends. The company derives its revenue from the lease of land and water rights to the Utah Copper Co. and others, which pays six per cent per annum on a $50,000 investment. The property of the company is situated at the lower end of Bingham cañon, and the great milling plant of the Utah Copper Co. is located upon it.

The Welsch-Lofftus Rare Metals Co. recently received returns from a carload shipment of ore containing the rarer metals from the property of the company in Grand county, which netted about $6,200. The uranium and copper paid all the expense of mining, transportation, treatment, etc., while the sum obtained from the vanadium, $6,000, and that from the radium, $200, was clear gain. Another shipment will be made soon. The vein from which the ore was taken is described as being about 7 ft. in width.

Paradise. Oct. 27.

In this district, the Chiricahua Development Co. continues to gain depth steadily in its main working shaft, being at the present time in a little over 300 ft. The objective point for which this company is working is the 500-ft. level, where it will start its cross-cut. At the Mars shaft, about 2,000 ft. distant in a westerly direction from its main works, the company has a double cylinder, single drum hoisting plant, and is sinking an incline prospecting shaft of one and one-half compartments. The shaft was started in ore on the surface in the vein and has followed the foot-wall. The shaft has been in ore all the way down, and continues at a depth of about 300 ft. The ore is a heavy iron sulphide and carries commercial values in copper. The company does not know the extent of this ore, as it has never cross-cut to the hanging wall. This it will do in a short time. All work at this property is going along satisfactorily, with the usual force of about 45 men. Mr. James H. Knowles is superintendent.

Gallon and Forest, who own 16 claims in the district, are busy on their assessment work. Mr. Gallon is now in the East trying to interest capital in his properties.

The Duluth & Chiricahua Development Co. has given up its bond on the Scanlon group, located on Harris mountain, about two miles east of Paradise. Mr. Scanlon is now doing his assessment work.

The Sullivan group, owned by the Duluth & Chiricahua Development Co., has a few men at work doing the annual assessment work. On one of the claims a cross-cut tunnel to tap a shaft that is now down 60 ft. is being driven. This work is being done so as to take out by gravity a large body of lead ore that has been developed. The tunnel cut the formation 10 ft. below the bottom of the shaft, and the same class ore as above was encountered.

The Rieder property, which is under bond to a prominent engineer, is showing remarkable results. The main ledge of this property has been opened by various cuts, tunnels and shafts, and is traceable on the surface for a little over 4,500 ft. The main tunnel, nearly in the center of the property, is in 274 ft. and cut through the vein to the hanging wall. At the point of cutting the vein is 40 ft. thick, the structure of which is metamorphosed lime and quartz, thoroughly impregnated with iron sulphurets that carry the sulphides of copper. The ore is of a commercial value. This property is now sufficiently developed to open for permanent work, and I am informed that a large plant of machinery is being negotiated for, and that within a short time a force will be put to work.

The Cochise Consolidated Copper Co., which is at work on the Davis group, reports work progressing, and that an accumulation of ore

is being taken out for shipment in the near future. The company worked Mexicans for a time, but have now let them out, and are as fast as possible putting on white labor. Mr. C. B. James, of Scranton, Pa., who is the secretary and treasurer of the company, is now personally in charge of the work.

The Leadville property, under lease to a local syndicate, is making regular shipments of lead ore to the El Paso smelter.

At the Duncan group, owned by Mr. John A. Duncan, of St. Joe, Mo., there are five men at work on development. This property lies next to the Chiricahua Development Co.'s ground on the south.

In the town of Paradise, progress of a substantial character is going forward. Recently a large schoolhouse was erected, a school district granted by the board of supervisors, a teacher engaged and the school opened with 35 scholars.

The Chiricahua Lumber Mills Co., which owns the sawmill on the range above Paradise, and which has a lumber yard in town, is erecting a store and office building at its yard.

Toronto. Oct. 28.

Thomas W. Gibson, director of the Provincial Bureau of Mines, states that prospectors continue to make discoveries in the cobalt-silver region south of Haileybury, in the Temiskaming district. A number of new veins have been discovered within the last month. A new type of deposit is that in which native silver occurs abundantly in the diabase or gabbro. Most of the veins at first discovered were in the slate or breccia. Mr. Miller, provincial geologist, has made a preliminary investigation of the iron range in Boston township, on the Blanche river, located last year. The range is not so wide as those near Lake Temagami, and the ore is magnetic in character. Some interest is shown in the placer gold deposits of the Vermilion river, and propositions for their working are afloat. The gold occurs in gravel and is very fine.

W. E. H. Carter reports that the Sunbeam gold mine, otherwise known as A. L. 282, on the Canadian Northern railway, west of Port Arthur, Ont., is in active operation, producing gold. A party of American capitalists interested in the mine, including Henry Folger and several brokers from New York; C. Adams and W. White, of Duluth, accompanied by T. Jones, manager of the company, recently inspected the mine, and when they left took back with them two gold bricks, weighing six pounds each, and worth about $3,000. Considerable preliminary work has been done on A. L. 200, adjoining the Sunbeam. At Steep Rock lake, Mackenzie, Mann & Co. are diamond drilling on an iron pyrite property. At Loon lake, east of Port Arthur, a good deal of work has been done by Flaherty & Knobel. Wiley & Co. and R. McConnell showing that considerable hematite exists in that region, which is likely to become an important factor in ore production.

Major J. A. Currie, president of the Northern Iron & Steel Co., has been nominated by the Conservatives as their candidate for the House of Commons in North Simcoe, which includes the town of Collingwood, where the company's works are situated. The mining and metallurgical interests have so far had few representatives in Parliament, and should Major Currie be returned, his practical experience will make him a valuable accession to the House.

The Dominion Government has granted to the North American Transportation & Trading Co. a supplementary lease to the hydraulic mining location it at present occupies on Miller creek, in the Yukon territory. The first lease was issued September 10, 1901, the territory having previously been withdrawn from placer mining entry. Subsequently, however, entries were made for a number of placer claims within the company's location, including 21 claims which were the property of the company, and which it considered part of its location. The Yukon inspector of agencies reports that the company has expended large amounts in constructing ditches and a reservoir to be used in working a hydraulic elevator, and that the works are nearly completed and will be in operation before the close of the present season, and are now employing 90 men. The present lease is made to give the company an assured title in view of the confusion that has arisen over the granting of placer claims.

The stimulus given to the production of lead by the offer of a bounty for which $500,000 was voted by the Dominion Parliament, has been so great that, at the rate at which claims are now being presented, the grant will be exhausted before the close of the fiscal year. In that case the claimants cannot receive the full bounty of 75c. per 100 lb., but will get a pro rata sum of the total grant.

Phosphate yielding mineral land to the extent of 2,000 acres in Burgess township, in eastern Ontario, has been secured by a German-American company, which is capitalized at $75,000. Fifty men are employed, and the phosphate is being shipped to Germany.

William N. Beach, president, and A. H. Alker, vice-president of the Pennsylvania Cement Co., visited Ottawa on October 20 as the guests of J. S. Irvin, manager of the International Cement Co., and during their stay made a critical inspection of the plant of the International, at Hull, Que., just across the Ottawa river. Mr. Beach expressed the opinion that it was one of the finest plants in the world, and should produce cement of the highest quality. He said that the splendid water-power gave the Canadian producer a great advantage, as his own company was paying 12c. per barrel for steam power. He predicted a great future for the industry.

The Divisional Court at Toronto, on October 24, rendered a decision in the appeal case of Cameron vs. the Mikado Gold Mining Co. By the judgment of the lower court the plaintiff recovered $1,411 and costs on account of an agreement whereby Cameron undertook the control of the mining operations, boarding house and store of the company. Against this decision the company appealed. The court sustained the judgment and dismissed the appeal, with costs.

Victoria. Oct. 25.

Attention is again being directed to the Quatsino district, the northwest section of Vancouver Island, and as a result of recent examinations of the June group—Comstock, Superior and Edison—it is reported that work will shortly be resumed on these properties. A deposit of zinc ore (blende) near Victoria lake also promises well. Prospecting is difficult in this district, on account of the fallen timber and the mountainous character of the country. Nevertheless, the mineral showings so far discovered well warrant further investigation. On the west coast of Vancouver Island, the Nahmint, or Hayes, mines are about to be reopened and operated by a Portland syndicate. This property in the past was grossly mismanaged.

At the Britannia mine, Howe sound, an aerial tramway and a concentrator building are now nearly completed. Three car-loads of machinery have arrived, and a large further consignment is expected. An idea of the magnitude of the construction work is conveyed by the fact that the company purchased from a Vancouver firm 1,000,000 ft. of lumber for building purposes.

Drilling operations for oil at Steveston are still in progress, a depth of about 1,100 ft. having been reached. At this depth the pressure from gas ranged from 60 to 90 lb. to the square inch. A. Dick, inspector of mines, has been suspended, pending an investigation of charges preferred against him of wrongfully accepting pay from the Crow's Nest Coal Co. while occupying a position of public trust.

Development work on the Monarch, at Cayoosh Creek, is being actively prosecuted, with, it is said, promising results. Coal boring operation are in progress at Samburn lake, on the watersheds between the Quilchena and Otter valleys, in the Nicola district, under the direction of, respectively, the Diamond Vale Coal Co., the Nicola Lake Coal & Coke Co., and the Canadian Pacific Railway Company.

Placer work at Camp Creek, in the Big Bend, has proved a 300-ft. channel of gravel, auriferous to a depth of 15 ft., from which a first-class clean-up was recently made.

Shipments of ore from the Badshot, in the Lardeau, said to average $150 to the ton, are to begin shortly, the property having recently been acquired under lease. At the Triune, the No. 3 tunnel, commenced in August, is in 200 ft. on the vein. It is proposed to connect No. 2 and 3 tunnels and work the mine by a shaft during the winter, when the entrances to the tunnels will be blocked by snow. The mill of the Ferguson Mines, Ltd., is now producing about 300 tons of concentrate a month. It is stated that the percentage of values saved is satisfactory. A small initial shipment of ore containing the high silver value of 589 oz. to the ton was made from the Spyglass, in Poplar creek, to the Nelson smelter last week.

The Payne mine, in the Slocan, which for some time past has been seriously handicapped by debt and lack of working capital, has been closed to allow the adjustment of financial difficulties. The directors recently endeavored, unsuccessfully, to raise funds by an issue of debentures, shareholders evidently trusting that the profits from ore shipments would be sufficient to meet the liabilities. As the mine itself promises well, the directors should have no great difficulty in inducing shareholders to consent to any well-considered scheme of reconstruction. Only two concentrators are at present in operation in the vicinity of Sandon, the unusually dry season having caused a considerable shortage of water. At the Last Chance, the shaft workings are down 200 ft. in ore. Drifting on the vein will be begun at once.

Shipments from the Slocan City division have already exceeded last year's total production by 500 tons. A shipment of high-grade silver ore is being made from the Bondholder by the lessees, while the Chapleau is again being worked under lease. The owners of the Kilo, from which a car-load of ore was recently shipped, contemplate erecting a 20-stamp mill on the property in the spring.

The Kootenay Ore Co. is making rapid progress in the erection of its zinc separator, in connection with the sampling works at Kaslo, in the Slocan, and it is expected that the plant will be in operation early in the spring. Some of the machinery and lumber are already on the ground, the site for the separator has been graded, and a force of carpenters has begun construction. The buildings will be 80 by 100 ft., and will be equipped with magnetic zinc separators, by which zinc contents can be raised 50 per cent.

The British Columbia Standard Co., owning the Hunter V mine, at Ymir, contemplates installing a 35-ton ore crusher, and possibly other machinery at this property, in which event an electric power plant will be placed on Porcupine creek. It is reported that the second Relief mine, at Erie, has been sold to an American syndicate for $100,000.

Mr. R. W. Brock, who has been retained as an independent expert to examine Le Roi, War Eagle, Center Star and Snowshoe, and report on the proposal for the consolidation of these interests, has begun his task, and is now examining the Snowshoe mine, in the Boundary district. The criticisms which have recently appeared in certain local newspapers suggesting that the proposed amalgamation is not in the interests of Le Roi shareholders, is, therefore, until Mr. Brock's opinion is given, premature. Examinations of the respective properties will also be made by Mr. E. B. Kirby, representing the War Eagle-Center Star interests, and by Mr. J. W. Astley, representing Le Roi.

The work of sinking the shaft on the Granby company's Old Ironside mine from the 300 to the 400-ft. level has been started. The No. 2 shaft of the mine is already down to the 400-ft. level, but there are yet no workings on that level from this shaft.

The annual meeting of the Providence Mining Co. was held last week at Greenwood. The net profits for the year were $26,000 or over 16 per cent on the issued capital. During the year 944 tons were shipped, of the net value, after deducting freight and treatment charges, of $68,424, the average value per ton being $72.48. This shows a decrease, attributed to smaller gold values, in the average value of the ore mined last year, which was $100 per ton. The total cost of mining, direct and indirect, was $44.87. The mine was developed during the year by drifting, 650 ft.; sinking, 91 ft., and raising, 119 feet.

Monterey. Oct. 26.

The mineral production of Mexico for the fiscal year ending in June, 1904, amounted to $150,000,000, on a Mexican silver valuation, of which $82,500,000 was silver, $32,500,000 gold, $19,500,000 copper, $6,500,000 lead, and the remainder in coal, iron and oil. Of the metals there were exported, also on Mexican valuation, $79,000,000 silver, $11,000,000 gold, practically all the copper and $5,000,000 lead. The iron, coal and oil were consumed at home. It is certain that this year will be far in advance, for the dividends alone of 20 companies paying them in Mexico City have so far amounted to $470,000 in July, $425,000 in August, and $450,000 in September, in Mexican currency. This does not include any of the close corporations, or any of the companies in the States of Zacatecas, Coahuila, Chihuahua or the west coast, and only the Peñoles company, of Mapimé, in the State of Durango. These will make a great addition, for Chihuahua alone is a leader with Santa Eulalia, as the most productive camp in the Republic, Parral, Jesus Maria, Cusihuiriachic, Batopilas, Morelos, Sierra Rica and Guadalupe y Calvo. The Lluvia de Oro, which was bought 18 months ago by H. E. Carey, of New York and Salt Lake City; H. S. McKay, of Los Angeles, and associates, is fast becoming a most important camp in itself. When it was purchased, on the recommendation of R. J. Coleman, formerly in charge of the Samuel Newhouse interests in Salt Lake City, at $2,000,000 gold, it was thought by many that it would prove "a pig in a poke," as it was then little more than a prospect. It is now claimed, however, that in these few months there has been opened up over $4,000,000 gold worth of ore, low in silver, and a free-milling gold, so that the owners believe they have the richest property in Mexico. The production of Parral and Santa Barbara now amounts to 37,000 tons a month, of which approximately 20,000 tons goes to the smelters, 12,000 tons to the mill of the Montezuma Lead Co., 2,000 tons to the Marcial mill, 2,000 to the Parral Milling Co., and 1,000 tons are treated by the Stallforths, in the patio.

In Coahuila, the Palomas, near Los Muestros, is drilling for the vein of the Cabrillas, which it adjoins. The Jimulco Mining Co., of Jimulco, after some difficulties over the grades and curves of the new railroad, has finally adjusted matters, and is shipping again. El Rey de Cobre, in a new district near Jimulco, is making an excellent showing with 14 per cent copper and some silver. It will probably be in charge of A. L. Tuttle. The Mazapil Copper Co. has closed its smelter at Mazapil, Zacatecas, but continues the one at Concepcion del Oro for its own and custom work. It is having plans and estimates drawn for a new smelter at Saltillo.

London. Oct. 22.

It is some time since we heard of the Etruscan Copper Estates, Ltd., the English company operating mines in Italy in a manner designated by Mr. Moreing as "opera-bouffe" mining. The continued promises of definite results were always falsified by events, and we were coming to think that the directors had lost faith in their own prognostications. It was startling, therefore, to hear that the directors now intend to issue more capital, in the form of 100,000 new preference shares of £1 each, entitled to the sensational dividend of 20 per cent. The capital at present is £575,000 in ordinary shares, and there are £200,000 in six per cent debentures, so that the mine is already heavily overloaded. No doubt the shareholders will consent to the new issue, but few will take up shares. Surely by this time everybody must have lost faith in the company, and the only reason for taking up these preference shares will be to help to support the market for the ordinary shares and the debentures. Some time ago I wrote that many people here wondered at some of the technical staff at the mine continuing to hold their positions. I am pleased now to record that the mining superintendent, Mr. J. H. Fawcett, has severed his connection with the company, and has thus removed himself from an anomalous position. Mr. Vavasour Earle, the chairman of the company, rightly referred to Mr. Fawcett as an experienced mining engineer and metallurgist, and naturally he has been very quiet about Mr. Fawcett's resignation.

Another copper company that has met with vicissitudes, but for a totally different reason, is the Caucasus Copper Co., Ltd. The company was formed four years ago, and the shares subscribed privately by the friends of several eminent commercial and banking houses in London. The leading spirits are Mr. Vivian Smith, a member of the Smith banking family, and Mr. Pierrpont Morgan, Jr., and the leading supporters are to be found among the Barings, Hambros and Mathesons. The original plan was to smelt the ore direct, and large sums of money were spent on the erection of furnaces. It was soon found, however, that this was not the proper way to treat the ore, so the services of Mr. W. R. Van Liew, from Anaconda, were secured, and Messrs. Knox & Allen were engaged as consulting engineers and metallurgists. The ore is highly silicious and contains little iron, so the fluxing question is a serious one. On the other hand, the ore is difficult to concentrate by water. These three gentlemen have spent a great deal of time investigating the best means of concentrating, and have practically decided on the Wetherill magnetic process, the copper ore being made magnetic by heating to a certain point. Experiments in bulk were conducted at the Humboldt works, and now a small unit is being erected at the mine. In the meantime, smelting operations are at a standstill, and will not be renewed for six months or so. The capital originally subscribed has been spent, as well as large sums of money deposited on loan. It will be necessary to re-arrange the finances of the company before long, in order to provide funds for the concentrating work. With such names as I have mentioned at the back of it the company will, of course, have no difficulties in the way of raising the necessary money. I ought to add that the ore exists in very large quantities, and that the mine has been opened up and sampled in the best style. The ore reserves, as estimated to exist by Mr. Knox, exceed 1,000,000 tons, averaging 3.5 to 4.5 per cent copper. I hope before long to be able to send you fuller information about this important property. Another point of interest in connection with the finances of the company is that the Russian authorities insist on the opening of a profit and loss account at the very beginning, on the theory that where there is mining there is profit. To an English mind, the presentation of a profit and loss account at the present stage of the company's operations is anomalous.

Perth. Sept. 26.

Owing to the continued bear raid on Great Boulder shares, the company has issued a circular to shareholders setting forth the position of the mine. The ore reserves above the 1,600-ft. level, after allowing 15 per cent for contingencies, are estimated at 317,834 tons, containing 372,962 oz. gold. After paying dividends, the company has cash reserves of over £100,000. In addition to this, the opening up at the 1,750 and 1,900-ft. levels has proved the continuance of the main orebodies, thus showing the real value of the mine.

The Moore slime process, now being tested on the Boulder Perseverance, should result in enormous savings when adopted by the other mines, if what is claimed for this method is borne out by results. I need not give details of the process, as it is already in use in America. It will probably bring the present cost of treatment by filter press at about 3s. per ton down to 1s. per ton.

At the 1,200-ft. level of the Associated a fine body of sulphide ore 10 ft. wide has been cut, assaying 19 dwt. per ton. In the Ivanhoe, the winze below the 1,014-ft. level, on the middle lode, is in a strong body of ore, valued at 15 dwt. per ton. At the 640-ft. level of the Kalgurli, the body of ore in the drive is now over 27 ft. wide and of good grade.

At the Boulder Deep Levels the 900-ft. level is improving, and better grade ore is being raised; 700 tons were crushed in August, yielding 310 oz. fine gold.

The August yield of the Golden Horseshoe showed a good advance, and keeps this mine well ahead of all others; 15,300 tons were treated for 18,110 oz. fine gold.

The satisfactory developments at the northern end of the belt are attracting attention and encouraging much outside enterprise. A shipment of 18 tons of ore sent by the owners of the Hidden Secret lease to the smelters yielded an average of 23 oz. gold per ton. The formation of sulphide ore is over 6 ft. wide at the 150-ft. level. The Devon Consols, near by, has been steadily progressing. The owners have a 25-head stamp mill. At the 260-ft. level (bottom) the pay ore has been followed for over 700 ft. In the Devon Consols Extended an oxidized lode is being opened up at the 80-ft. level. The average width is 6 ft. Crushings from this lease to date have totaled 438 tons for 590 oz. gold.

The new lode found in the Big Blow, at Coolgardie, is opening well. At Davyhurst, the Golden Pole, a local company, has declared its first dividend of 6 per cent per share, which it is probable will be paid regularly each month from now on. The Lady Gladys, at Mulline, which has been a steady producer for several years, has cleaned up 693 oz. gold from 518 tons. At Norseman, the Cumberland has crushed 503 tons for 757 oz. gold. The mine and district are looking very well.

At Murchison, the Great Fingall Associated has started sinking the main shaft from the 125-ft. level. The new winding plant is working well. The reef at that level now shows 7 ft. of solid quartz, carrying payable gold. The Victory United has crushed 117 tons for 275 oz. gold. The mine is now looking very promising. Fields Reward has been re-started, and the property will be thoroughly tested at depth.

The Phillips River copper and goldfields are going ahead steadily. A government smelter will shortly be erected, and a private syndicate is erecting a new patent furnace. About 5,000 tons of high-grade ore, purchased by the government to assist the local lease owners, are lying ready for treatment.

Sydney. Oct. 4.

The Mount Morgan company has declared the usual monthly dividend, aggregating £12,500. The grade of the ore treated continues to show an improvement, the value of the ore crushed during August being £2 3s. 2d. per ton, as against £1 14s. 9d. for the same month in 1903. The steam shovel is removing the overburden at the rate of 37,000 tons a month. During a period of a little over 12 months, the nuggets found at the Dee River Rush aggregated 4,350 oz., valued at £18,000. About 65 of these nuggets weighed over 20 oz. each, and 24 over 30 oz. each; the largest weighed 182 ounces.

The coal miners have been successful in their protest against the reduction in the cutting rate proposed by the colliery owners in the Newcastle district. The arbitration court held that it was necessary for the owners to give three months' notice of the intended reduction. The owners have accordingly issued notices intimating that the declared selling price of coal will be reduced from 10s. to 9s. per ton from January 1 next, which, as explained in my previous letter, carries a corresponding reduction in the cutting rate to be paid to the miners. The miners express their intention of declining to submit to the reduction, and are organizing to this end. They propose, as a remedy for the existing state of affairs, (1) the establishment of a legal minimum selling price for coal and the prohibiting of underselling; (2) that no further leases to mine for coal be granted by the crown; (3) the nationalization of coal mines. The report of the inspectors of mines shows that the development of the coal deposits in the Ipswich district is proceeding rapidly, and that a number of new mines has been opened up. The coal measures in the Central district are also being vigorously prospected, but a large outlay will be necessary in the way of railroad connection before the output can be economically handled.

The mining for wolfram in the northern parts of Queensland is attracting much attention. Very favorable prices are being obtained for the ore, and as a result the sugar planters and others in the vicinity find great difficulty in securing laborers. At Deepwater, New South Wales, a considerable quantity of this mineral has been found. Practically the whole of the production is taken by German buyers.

F. S. MANCE.

TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Mr. W. B. Devereux is on his way to Mexico.

Mr. G. M. Gouyard has returned to Denver from Idaho.

Mr. Sydney F. Goddard, formerly at Kalgoorlie, is on his way to Peru.

Mr. J. D. Audley Smith has returned to Salt Lake City from an inspection in Idaho.

Mr. F. W. Traphagen, of the Colorado School of Mines, is now in the East.

Mr. J. W. Sutherland is again manager of the Golden Horseshoe mine at Kalgoorlie.

Mr. F. J. Hearne has been re-elected president of the Colorado Fuel & Iron Company.

Mr. E. W. Sebben, of Denver, has beeen in Gunnison county, Colo., on professional business.

Mr. C. M. Fueller, of Denver, has recently been making mine examinations at Kimberly, Utah.

Mr. Ernest Millar, of Kalgoorlie, arrived by the *Baltic* on October 28, on his way to Pittsburg.

Mr. Nicholas D. Durdin, of St. Petersburg Polytechnical Institute, Russia, is now in this country.

Mr. J. E. Clennell, the author of the new book on cyanide, is now at Redjang Lebong, in Sumatra.

Mr. George J. Rockwell, formerly at Butte, is now with the Allis-Chalmers Co., at Salt Lake City.

Mr. R. J. Grant is manager of the Cosmopolitan Proprietary mine, at Kookynie, West Australia.

Mr. Charles Janin has returned to San Francisco from a professional trip to Prince of Wales Island.

Mr. Willard F. Snyder, of the Western Exploration Co., has returned to Salt Lake City from the East.

Mr. R. P. Elliott, of Ocatlan, Oaxaca, Mexico, one of the owners of the Chicicapa mine, is now in this country.

Mr. Charles E. Knox, president of the Montana-Tonopah Co., is inspecting the company's properties in Nevada.

Mr. Charles C. Jones is in southeastern Idaho on business connected with the development of his phosphate discoveries.

Mr. Ernst Wiener, of the firm of Arthur Koppel, of New York city, has returned from a three months' trip to Europe.

Mr. B. M. Cornish, manager of the Pioche-Nevada Consolidated Co., at Pioche, Nev., has returned from a trip to London.

Mr. Charles Jacobus, of Springfield, Mass., who has been examining gold placer property in California, has returned home.

Mr. H. H. Kirkpatrick, formerly at the University of Illinois, is now instructor in civil engineering at Syracuse University.

Mr. J. Iles, lately manager of the South Kalgurli mine, has been appointed manager of the Central Chili copper mines, in Chile.

Mr. Newton B. Knox arrived from London on the *Baltic*. He sails by the *Manchuria* from San Francisco for Japan on November 15.

Mr. Arthur L. Pearse, accompanied by Mr. Sydney F. Goddard, sailed from New York by the *Yucatan* en route to Peru on November 1.

Col. W. C. Greene left New York October 29 to visit the mines of the Greene Consolidated Copper Co., at Cananea, Sonora, Mexico.

Mr. Joseph McDonald, general superintendent of the Alaska-Treadwell mine, Douglas Island, Alaska, is visiting at Portland, Oregon.

Mr. R. P. Coleman, of Denver, Colo., is on the engineering staff of the Lindsay Cananea Center Mining Co., at Cananea, Sonora, Mexico.

Mr. Edward Hooper, of London, consulting engineer of the Ymir Gold Mining Co., has been inspecting the company's property at Ymir.

Mr. E. E. F. Creighton, formerly with the General Electric Co., has been appointed assistant professor of electrical engineering at Union College.

Dr. P. Dvorkovitz, editor of *The Petroleum Review*, London, has been investigating the new oil discoveries in Indian Territory and Mexico.

Mr. Y. Watomahi, a representative of Japanese mining interests, is making an extended tour of examination and inspection in this country.

Mr. Hudson H. Nicholson has returned to Denver from an Eastern trip. After making a mine examination in Wyoming he will go to Sumpter, Oregon.

Mr. C. H. Markham has resigned as general manager of the Southern Pacific railroad to become general manager of the Guffey Petroleum Co., of Texas.

Mr. Clement F. Street has been appointed commercial engineer of the Westinghouse Electric & Manufacturing Co., to handle work in connection with steam railroads.

Mr. Mark R. Lamb, formerly with Chas. Butters & Co., in Mexico, is in New York in the interests of the California Hydraulic Engineering & Supply Company.

Mr. F. E. Fielding, for 31 years assayer to the Consolidated California & Virginia Mining Co., on the Comstock, has resigned. He was in New York this week on a brief visit.

Mr. T. D. Melton, representing the Spottswood Refining and Metallurgical Co., of Melbourne, Australia, is inspecting mines and smelters in this country. He is now in the West.

Messrs. Edmund Juessen, Roy H. Clarke, George O. Bradley, Thomas Cox and Charles E. Bruff have formed the Engineering & Contracting Co., with offices at Spokane and Seattle, Washington.

Mr. F. Lyon, civil and mechanical engineer for the United States Mining Co., of Salt Lake City, is at the Mammoth copper mine of the company near Kennett, Cal., where he will remain for several months.

Messrs. William A. Farish and B. P. Campbell, of Denver, and H. E. Kirk and W. E. Pomeroy, of Cananea, Sonora, have completed a trip through the Sierra Madre mountains, Mexico, in the interest of Colonel W. C. Greene.

Mr. Morris M. Green has resigned from the chair of mechanical engineering at the University of Colorado to take charge of the construction of extensive additions to the works of the International Acheson Graphite Co., Niagara Falls, N. Y.

Mr. G. B. Wilson, who for the past five years has been acting as engineer-in-chief of the Chinese Engineering & Mining Co., Ltd., of Tientsin, China, has returned to the United States, and will reside at Los Angeles for a year or two before returning to China.

Mr. J. H. McKibben, secretary of the King Powder Co. and of the Peters Cartridge Co., of Cincinnati, Ohio, with his brother, Mr. W. K. McKibben, of Chicago, are interested with Mr. John Henderson, of Nogala, Ariz., in the development of copper property in Sonora, Mexico.

OBITUARY.

Henry Irving Snell, a consulting mining engineer, died in Philadelphia, October 20, aged 70 years.

John Lane, a pioneer coke manufacturer of the Connellsville region, died at Parkersburg, W. Va., October 24, aged 82 years.

J. Wyman Jones, a well-known mine owner and the founder of Englewood, N. J., died in New York City, October 27, aged 88 years.

David N. Upton, one of the founders of Butte, Mont., and a pioneer miner of the West, is dead at Deer Lodge, Mont., aged 68 years.

Gerald M. King died at Monterery, Mex., October 20, of typhoid fever, aged 38 years. He was resident manager for the Victoria Mining Co., of El Oro, Mex. Mr. King was a graduate of the Colorado School of Mines.

We regret to record the death of the great German teacher and investigator, Prof. Clemens Winkler. He passed away in his 66th year on October 8, at Dresden. It will be remembered that Prof. Winkler was for many years connected with the Bergakademie at Freiberg. He was eminent in inorganic chemistry, being especially known for his work in technical gas analysis, and in the discovery of the element, germanium, predicted by Mendeléef as eka-silicon. But, best of all, he had a lovable personality, endearing him to a wide circle of friends, who now mourn him.

Cornelius Shields, general manager of the Consolidated Lake Superior Corporation, of Sault Ste. Marie, Ont., died suddenly, October 28, from heart failure, after an illness of only a few hours. Mr. Shields was recognized as one of the leading steel and iron experts of the continent. He was a native of New York State, and began his business career under J. J. Hill, of the Northern Pacific railroad. He rendered excellent service to the Dominion Coal Co., and he was for two years receiver for the Virginia Coke Co. He was later manager of the steel plant at Sydney, N. S., which position he resigned to manage the industries at Sault Ste. Marie. During the financial crisis which threatened the future of the enterprise he took a prominent part in effecting the reorganization of the companies on their present basis, and latterly devoted himself energetically to getting the various plants in operation. Mr. Shields was 49 years old and leaves a widow and seven children.

SOCIETIES AND TECHNICAL SCHOOLS.

American Society of Mechanical Engineers.—The list of officers to be voted for in the ensuing year, as presented by the nominating committee is as follows: For president, John R. Freeman, Providence, R. I.; for vice-presidents, S. M. Vauclain, Philadelphia; H. H. Westinghouse, Pittsburg; Fred W. Taylor, Philadelphia; for treasurer, Wm. H. Wiley, New York City; for managers, George M. Brill, Chicago; Fred J. Miller, New York city; Richard H. Rice, Lynn, Mass. The headquarters of the society at the annual meeting will be at the society house, No. 12 West Thirty-first street, New York City, and the opening session will occur on December 6. President Ambrose Swasey will deliver the annual address, the subject being on 'The Achievements of the Engineer With Respect to Exact Measurements.' The second session will be held December 7, at the hall of Mendelssohn Union, No. 113 West Fortieth street. This will be the business session of the convention.

Columbia School of Mines.—The cornerstone for the new building was laid with appropriate ceremonies on October 31 by the donor, Mr. A. Lewissohn. Further reference to this event will be found in our editorial columns.

University of Illinois.—The department of geology of the University of Illinois has recently received a collection of some six hundred specimens of gems and precious stones. The department is also making a collection of granites, marbles, serpentines, dolomites, and other stones used for decorative purposes.

TRADE CATALOGUES.

The Goheen Manufacturing Co., of Canton, O., is sending out cards setting forth the merits of its oxidized carbon cement.

The Browning Engineering Co., of Cleveland, O., devotes bulletin No. 4 to a description of No. 2 and 3 standard locomotive cranes. There are many excellent illustrations.

Catalogue No. 1,020, of the Atlas Car & Manufacturing Co., of Cleveland, O., contains descriptions of mine-car trucks, car axles and standard types of cars made by the company.

The new catalogue of the Wm. B. Pollock Co., of Youngstown, O., is an exceptionally artistic piece of handiwork. It is a pictorial review of the work erected by the company, with photographic reproductions of the furnaces built by it in various parts of the country.

The F. M. Davis Iron Works Co., of Denver, Colo., in its catalogue No. 38, has prepared a very handsome and interesting volume of 105 pages, containing illustrated descriptions of their smelting machinery, roasting cylinders and furnaces, briquetting machinery and blast furnaces for copper ores.

The catalogue of the Lidgerwood Manufacturing Co., of New York, makes an impressive volume of 160 pages, which contains descriptions and some illustrations of the cableways made by the company. Considerable space is devoted to the marine cableways for coaling war vessels at sea, which were originally invented by this company. The typographic work of the book is of a very high order.

INDUSTRIAL.

The Denver branch of the Jeanesville Iron Works Co. has received an order from Parral, Mex., for a compound condensing pump.

A gold medal was awarded to the Boston & Lockport Block Co. for improvements in tackle blocks contributed to the Louisiana Purchase Exposition at St. Louis.

The Hydro-Carbon Manufacturing Co., of Denver, Colo., has made a large shipment of their Elateroid wood preservative to the Southern Bell Telephone and Telegraph Company, of Atlanta, Ga.

The firm of Cord & Hawksworth, of Helena, has secured from Allen G. Mason a contract to furnish the machinery and erect a 100-ton concentrator at the New Era and Bullion King mines, in Broadwater county, Montana.

The Eureka Fire Hose Co., New York, has been advised that its "Eureka," "Paragon," and "Red Cross" brands of seamless rubber-lined fire hose have been awarded the highest honors at the St. Louis World's Fair—a gold medal.

The Nissen Engineering Co., of Los Angeles, Cal., has closed a contract in San Francisco for the sale of four of its mills and a Llewellyn crusher, to be installed on the Omparica Gold Mining Co.'s property in Mariposa county, Cal. The officers of this company are the Pacific coast representatives of the Standard Oil Co.

The Colorado Iron Works Co., of Denver, Colo., reports the sales of three sets of improved standard 36 by 16 in. wide-faced crushing rolls to the Montana Zinc Co., in Montana, and a 36-in. copper matting furnace to the Taylor Engineering Works, in New York. Two carloads of machinery for the El Cobre Mining Co., in Cuba, recently left the works.

The Chrome Steel Works, manufacturers of chrome steel shoes and dies and other fixtures for gold and silver stamp mills, also welded chrome steel and iron plates for safes and safety vaults, who have been located in Brooklyn, N. Y., for a great many years, have removed to Chrome, N. J., where an extensive plant, covering several acres, has been installed.

Messrs. Chalmers & Williams, of Chicago, while dealing in machinery and supplies for mine, mill and smelter, will make as one of their specialties the Sederholm boiler, adopted by the Pennsylvania railroad, Homestake mine and other important companies here and abroad, the exclusive manufacturing rights to this boiler having been purchased by this company from Mr. E. T. Sederholm.

In San Luis Potosi, the Barreno mine, of San Pedro, has won in its suit with the Victoria over disputed territory, which the Victoria people were working. From Matehuala, the mining company of Santa Maria de la Paz has finished its railroad connecting with the Mexican National, and it is understood that the National Metallurgical Co., for which J. B. Kilton has been working for some years, and which owns or controls mines in Matehuala, Catorce, Charcas and Salado, has finally given the contract for the erection of two 150-ton lead blast-furnaces in Matehuala. The power will be derived from Jordan river. M. M. Gonzales, with only 75 ft. in depth, has a good copper showing in his property at Monte Cristo. E. L. Doheny, president of the Mexican Petroleum Co., at Ebano, reports that the sale of $750,000 gold bonds was for the purpose of putting in improvements, principal of which is the construction of a canal four or five miles to the Panuco river, for the transmission of barges to Tampico in the handling of the Gulf trade. The two engines on the company's railroad are burning oil.

The Crawford & McCrimmon Co., at 14 B, Mines building, at the World's Fair, exhibits the only direct-motion hoisting engine at the exposition, and the only one of any kind used for hoisting coal out of shaft mines, combining all the improvements up to date. The acid-proof pump is invulnerable against acid water in mines. These exhibits are open for inspection, and the criticism of experts is invited. The mining fan of this company is exhibited in the mining gulch in one of the smaller sizes. The attention of the public, and of mining engineers especially, is requested while the machinery is still on exhibition.

The Cutler-Hammer Manufacturing Co., of Milwaukee, after taking propositions from the competing manufacturers of electric apparatus for the equipment of its works, proposed to the bidders to refer the selection of the make to a committee of distinguished consulting engineers. It was decided to place the matter in the hands of the well-known consulting engineers, Messrs. Sargent & Lundy, of Chicago, who, after consideration and deliberation, awarded the order to the Northern Electrical Manufacturing Co., of Madison, Wis. as the best type of electrical machinery for industrial plant service. The order consisted of a 75 kw. and a 37.5 kw. generator.

GENERAL MINING NEWS.

CALIFORNIA.

AMADOR COUNTY.

Amador Queen Mining & Milling Co.—In this mine the lessees are sinking the new shaft and running drifts in the search for small seams of rich quartz.

Kennedy Mining & Milling Co.—At this property, at Jackson, the new furnace for the chlorination works has been finished and fired up. The cement floors in the new mill are being laid for the concentrators.

CALAVERAS COUNTY.

Big Trees Mining Co.—This company, owning mines near Murphy, is about to issue bonds for $1,000,000 to construct and equip a smelting and refining plant at Murphy and build a railroad from that place to tidewater.

Chris Andersen.—The machinery for the new mill of this mine is being hauled to the site and the mill is expected to be running in November.

Hedrick.—The shaft at this property has reached bedrock and very good gravel has been struck. The deposit is a 4-ft. bed of gravel.

EL DORADO COUNTY.

Delwish.—It is reported that this mine, near Georgetown, has been sold to a company, and that development work will begin at once. A gravel mill of 100 tons daily capacity is to be put up.

Monte Mining Co.—In this mine, Gold Hill district, a new 10-stamp mill has been installed. They have also a 2-stamp Hendy mill, both mills being run by water power. The 7-ft. ledge is reported to be paying well.

KERN COUNTY.

Amalie District.—The Vandalia mine will be reopened this month, with R. J. Sange as manager. The Santa Rosa, owned by Blodgett & Co., of Bakersfield, has again been opened, and it is expected that a mill will be erected. The Barbarossa is reported sold. At one time this mine was quite a large producer.

LOS ANGELES COUNTY.

Saugus.—The placer deposits at this place carry very fine gold, which is hard to save. It is thought that the Wishart placer mining machine will be able to save the gold, and the Oaks Mining Co. is about to install two of the machines.

NEVADA COUNTY.

Federal Loan Mining Co.—Superintendent L. A. Sutherland, of this company, has unwatered the shaft and put in a new pipe-line.

Lecompton Mining Co.—At this mine, Willow valley, W. H. Dunlop, superintendent, the shaft has been sunk 100 ft. deeper.

Posey Mining Co.—After a long period of idleness, the mill of this mine, Willow valley, has started again.

Spanish Ridge.—This mine, near Washington, has been operated for two years past by Egan Bros. and others under bond. They have now encountered a large ledge of $10 rock. Ten more stamps are being added to the present 10-stamp mill.

PLACER COUNTY.

Numitor.—This mine, near Chicago Park, formerly the Mountain Maid, is again in running order. The 15-stamp mill is running steadily. The shaft is being rapidly unwatered.

Red Point.—This famous drift mine, given up some months since by the French company, which has operated it for years, is now being worked by leasers, who are getting good pay dirt after much dead work. They are at work about half way in the tunnel, the entire length of which is four and a quarter miles.

RIVERSIDE COUNTY.

El Dorado.—This district, 12 miles southeast of Twenty-Nine Palms, has 29 mining claims, most of which show free gold. Among the mines are the Lost Horse and Desert Queen, both of which have in the past yielded largely. The district lacks water, but this difficulty is about to be overcome.

SAN BERNARDINO COUNTY.

Ludlow Belle Mining & Milling Co.—A new and promising vein has been opened up in this property, at Camp Rochester. The ore is thought to be exactly like that being milled by the Bagdad company. The ledge is about 5 ft. in width.

SAN DIEGO COUNTY.

Nobles Gold Mines.—The English company operating this property has been reorganized, with J. H. Thrings as principal owner. Mr. J. Andrew Wauchope, general manager, is about to ship two 100-ton Lane roller mills from San Diego to the mines at Descanso. The mills are each 10 ft. in diameter.

Stonewall Mining Co.—This old mine, at Cuyamaca, is about half unwatered. The timbering in the shaft is found to be twisted out of position in many places, and large masses of rock are found in positions indicating that some earthquake disturbance has displaced them. The mine has been filled with water for some years.

SANTA CLARA COUNTY.

New Almaden.—These quicksilver mines, owned by The Quicksilver Co., at New Almaden, have not been closed down, as reported, but a few old prospects have been abandoned and 25 men discharged in consequence.

Sargent.—Two more producing wells have been opened in this district. The finding of the oil in the Alberta well at 1,070 ft. depth is though to demonstrate that the Sargent district is underlaid with an extensive reservoir of oil, and this is expected to lead to more rapid development.

COLORADO.

BOULDER COUNTY.

American Star.—A good strike is reported at this property on Left Hand creek, the ore running from $40 to $200 per ton. The upper workings (3) produced $250,000, but the ore shoot was lost, and it is believed that it has again been found. Lou R. Johnston, Boulder, is superintendent.

Grand View.—At this property, in the Sunshine district, Col. W. B. Teters has opened up a fine body of wolframite, carrying assay values of upwards of 50 per cent of tungsten acid. The property has a good record as a gold producer, and it was at first thought that the dark mineral was a low-grade hematite until tests were made.

Inter-Ocean.—Chicago parties have organized the Inter-Ocean Mining Co., for the purpose of operating this property in Sunshine district, and arrangements are being made to operate on an extensive scale, with A. E. Healey, Sunshine, as manager.

White Crow Gold Mining Co.—This company has sold its group to E. S. S. Brockman, of Pittsburg, Pa., and J. S. Miller, of Colorado Springs, paying the reported sum of $200,000. The mine will be re-equipped and steps taken to operate on a liberal scale.

GILPIN COUNTY.

Gilpin county secured a silver medal for its display of quartz ores at the World's Fair.

Cashier Gold Mining & Reduction Co.—A 50-h.p. Vulcan hoist is being installed at the Pittsburg mine in Russell district, and the 600-ft. shaft will be sunk one or two lifts of 100 ft. at once. Regular shipments of a good grade of smelting ores are being made, and regular dividends are being paid by the company every 60 days. B. L. Campbell, Central City, is superintendent.

Onoko Gold Mines Co.—This company has taken the Annex lode claim in Lake district under a lease and bond. The main shaft, in 170 ft. deep, will be sunk and developments carried on in drifting and cross-cutting. L. R. Roy, Central City, is manager.

Reward Gold Mining & Reduction Co.—A dividend was declared last month, and one is payable on November 1. The company owns a group of 17 lode claims and two tunnel sites in Enterprise district, and is shipping a fair grade concentrating ore. The company may erect its own milling plant on North Bear creek before next spring. A. W. Stone, No. 6 Erie County Bank building, Buffalo, N. Y., is general manager and secretary.

LAKE COUNTY—LEADVILLE.

The output for October will reach 72,000 tons of all classes of ore from the district. The increase comes from the Reindeer and the Yak tunnel, also from ore shipped by the lessees on the Ibex property, which this month will reach 5,000 tons.

Cora.—This mine, in the Lake Park section, which has been worked for several years by Gus. Swegbert, opened up during the week a vein of ore that is a foot wide, running 2½ oz. gold, 15 oz. silver and 10 per cent lead. The vein is a fissure worked by a tunnel, which is in 600 ft., and the ore was found at the breast. The claim is east of the Haphazard.

Coronado.—Considerable ground has been opened up in the new ore zone, and shipments will start by the first of the month. Sinking has begun on the Penrose, and the south drift from the Coronado is being driven speedily to make the desired connection and lighten the burden of water at the Penrose.

Eclipse.—The shaft at this mine is down a little over 1,000 ft., and considerable drifting has been done from the bottom. In the drift to the southeast, a good body of mineral has been opened that runs from 2.5 to 5 oz. gold per ton. The claim lies east of the Jonny, and shipments now are regular.

Fanchon.—The work of sinking an extra lift of 250 ft. on the shaft will be completed in a few weeks, when the tunnel from the north side of the hill will be started and connect with the bottom of the shaft. The Iron Silver Mining Co. owns ground in this hill and will drive a tunnel this winter to develop the claims.

Gnome.—This mine, toward the upper end of South Evans gulch, has completed the sinking of the new shaft, and the development work now being carried on is in the direction of the Izard, to catch the ore-shoot extending from that property into the Gnome ground.

Humboldt.—This mine, in Adelaide park, is shipping a very good grade of ore amounting to 50 tons a day. Development work is being carried on from the lower levels in virgin territory, and the outlook is encouraging.

Ollie Reed.—The new shaft on this property is going down rapidly, and in a few weeks the desired depth will be gained, when drifting to the orebody will be commenced. From the old shaft the regular quota of ore is being shipped daily.

TELLER COUNTY—CRIPPLE CREEK.

Acacia Gold Mining Co.—Work on the south end of the Burns claim of this company has been renewed with increased vigor. A number of other leases are being worked upon this property, both in the main shaft and on the Wrockloff shaft. The Morning Star is also being worked under lease.

Elkton Consolidated Gold Mining Co.—A large amount of work is being done on this property and considerable ore being shipped. The company is now in good shape financially, and it is rumored that the payment of dividends will be resumed before long.

Gold Exploration Tunnel.—Work has again begun on this tunnel into Gold Hill. A large amount of work has been done. It now penetrates the earth for about one and one-half miles. The end of the tunnel is at present somewhere in Raven hill, not far from the Mountain Boy property. Mr. John Parfet has charge of the work.

Mary McKinney.—Preparations are being made for the trial of the apex suit between this company and the Aileen claim of the Morning Glory Leasing Co. This suit was to have been tried in July in the United States Court in Denver, but was continued until November. A number of prominent engineers are arrayed on both sides.

Stratton's Independence, Ltd.—Quite a number of the leasers on this property are doing very well. No work is being done by the company in the way of mining ore, it all being taken out by lessees. The hoisting and other work is done by the company and charged up to the lessees.

IDAHO.

BOISE COUNTY.

Osborne.—A vertical shaft will be sunk at this mine, at Pearl. Recent developments are said to be encouraging. G. M. Corns is superintendent.

CANYON COUNTY.

Rico.—At this mine, in the Warrior district, a tunnel is being run across the ledge.

CUSTER COUNTY.

Alturas.—This group of five claims, near Custer, has been sold to a company of Union Pacific officials for a reported consideration of $6,000. It is a silver-lead property.

IDAHO COUNTY.

Hawkeye.—A cyanide plant is to be installed on this group, at Clearwater.

Hump.—A scarcity of water has interfered with operations at this camp. At the Atlas, ground is being broken for a new mill.

SHOSHONE COUNTY.

Gold Hunter.—The mill at this mine, at Mullan, is being renovated. With the exception of the jigs, all the machinery is being refitted and replaced. Sixteen new tables will be installed—10 Wilfleys and six vanners. When all the changes are completed the capacity of the concentrator will be increased by 100 tons. This will nearly double the present capacity, which is 150 tons per day.

Wardner.—An extension of this property, at Mullan, numbering 100 claims and comprising over 2,000 acres, has been surveyed for the owner, A. Page.

ILLINOIS.

FULTON COUNTY.

Maplewood Coal Co.—This company has struck coal with the hoisting shaft at its new No. 2 mine at Farmington, on the C., B. & Q. railroad, and has started to sink its air and escapement shaft. George A. Ditewig, Peoria, is president.

MENARD COUNTY.

Petersburg Mining Co.—This company is installing elevators, revolving screen and bins for fine coal at its mine at Petersburg.

SANGAMON COUNTY.

Springfield Colliery Co.—This company held a meeting at Chicago, October 11, at which the following permanent board of directors and officers was elected: H. C. Adams, Chicago, president; C. F. Evans, Columbus, O., vice-president; D. W. Heath, Chicago, secretary and treasurer; William Burry, Chicago; Edw. H. Coxe, Springfield, Ill. This company owns one of the best undeveloped mining sites in Sangamon county, about four miles northeast of Springfield, on the Illinois Central and Wabash railroads.

LOUISIANA.

CALCASIEU PARISH.

Attakapas Oil Co.—This company has leased some property near the Bass gusher, at Jennings, and has begun drilling.

Bass & Benckstein.—This well is flowing 10,000 bbl. daily, and the field is at present producing more than any two southern fields, the estimated daily output being from 25,000 to 28,000 bbl.

MISSOURI.

ST. FRANCOIS COUNTY.

Catherine.—This lead mine, at Fredericktown, has passed under new management to Cleveland parties, who have organized the Madison Lead & Land Co., with a full paid capital of $600,000 to operate it.

Columbia Lead Co.—The No. 1 shaft of this company has finally closed down, and many think it will never be reopened. The No. 2 or new shaft has been shut down for about a year, so that this mine ceases to be a producer. This will affect the output of the district but slightly, as it never was an important producer, and the old mines have far more than made up for this deficit by their growing output.

St. Joe Lead Co.—This company is again enlarging its old, or Bonne Terre plant, by adding two new boilers and more jigs. It is now producing more lead than ever before in its long history, and with the new Hoffmann mill, the production at present is at the rate of about 30,000 tons pig lead per annum. It has been necessary to relight all the old roasting furnaces at Bonne Terre, in addition to running all the new roasters at the Herculaneum smelting works. Two daily passenger trains have been started from Bonne Terre to the new town of Owl Creek, which is rapidly growing about the Hoffman shaft.

MONTANA.

DEERLODGE COUNTY.

Blue Eyed Nellie.—It is reported that this mine, near Anaconda, has been leased and bonded to a Salt Lake company. The shaft-house recently burned by forest fires is to be rebuilt.

Jessie.—A good strike is reported in this mine, near Anaconda.

Pennsylvania.—It is reported that lessees at this mine, near Anaconda, have five feet of ore in a cross-cut tunnel.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boundary Ore Shipments.—Shipments for the week ending October 22 were as follows, in tons: Granby, 7,740; Mother Lode, 2,944; Brooklyn, 2,010; Emma, 1,287; Senator, 165; Oro Denoro, 66; Mountain Rose, 132; Athelstan-Jackpot, 180; total for the week, 14,524 tons; for the year, 647,938 tons.

MINING STOCKS.

(Full quotations on pages 734 and 735.)

New York. Nov. 2.

After heavy trading there has been a relaxation, partly because of gold exports, and also the withdrawal of buying orders by the public until the close of election. Still there seems enough support from insiders to prevent a slide back to the low prices of a few weeks ago, at least this is suggested by the systematic fluctuations. In the coppers, a lively time has been experienced, and Amalgamated on large trading was lifted to $74¼, the highest price this year, which is only 1¾ points below last year's. Later, during the softening up of the general list, Amalgamated fell back to $71⅞. Anaconda rose to $26.63, and Tennessee, after slipping off to $29, moved up to $32.25. British Columbia stood around $5.375, and Greene Consolidated made sales at $20.375@$26.

American Smelting & Refining shares are easier in price, the common selling at $70.875 @$74.50, and the preferred at $111.75@$113.50.

Boston. Nov. 1.

(From Our Special Correspondent.)

After a slight reaction in the middle of last week, due to further profit-taking, the market started up again and fairly boiled. Such active times have not been seen since the copper boom of 1899-1900. All stocks sympathized in the movement, and the broad, active market prayed for so long is at hand. After a short rally Saturday and a part of Monday stocks settled again, in sympathy with the New York list, but the close to-night again saw them soaring, with the probability that still higher prices will be reached. It is a fact that certain New York interests have been very prominent in this market, and the movement of some stocks clearly reflects this.

Perhaps the most conspicuous stock the past week has been Trinity, of which Thomas W. Lawson is president. From last week's close, at $11.75, it rose on tremendous dealings to $18, from which it reacted to $14.50 to-day, but easily recovered to $16.75 at the close. There are many rumors, but none can be confirmed at present. One is that the United States Mining Co. is to exchange its shares even for those of Trinity. The Mammoth, recently purchased by the United States, adjoins Trinity, and there is a possibility that a smelter may be erected jointly. Greene Consolidated did a stunt to-day on New York orders, rising to $24.87½, which is $3.87½ above the price a week ago. Old Dominion moved up 5.75 to $28.25, closing at $26.75. It is remarked that the Phelps-Dodge management of this property is showing results.

Quincy and Wolverine sold together at $100 per share, but subsequently Quincy touched $108 later, reacting to $103. Calumet & Hecla also rose, touching $600 per share, an advance of $35. The advance of these stocks is considered the best proof of the copper situation. Tamarack rose $7 to $125, reacting $3, and Osceola $7.50 to $94, reacting to $92. Shannon Copper is up $1.25 to $7.25 on reports of changes at the annual meeting, November 28, and the possibility that representatives of Phelps, Dodge & Co. may enter the directorate. President Gill and Director Belcher have already resigned, and Director Alvoid will. These gentlemen have all sold their stock. Mass is also up $1.75 to $7.25; Franklin $2 to $11; Michigan, $1.62½ to $10.50; Victoria, $1 to $5. Winona rose $3.62½ to $12.62½, but subsequently reacted to $11. Boston Consolidated sold down to $6, but recovered a part. The selling was for the estate of Director Casey, who recently died abroad. Amalgamated, after touching $65.87½, rallied to $71.12½ ex-dividend, closing at $71.

Allouez rose $3 to $15, reacting $1. Atlantic, $2.50 to $17.50, reacting $1.50; Bingham, $2.50 to $34.75, reacting $1.25. Centennial, $3 to $31.50, reacting $2.50; Mohawk, $2.75 to $53.50, reacting $1.75; Parrot, $2 to $28, reacting to 27.25; Utah, $2.87½ to $44.50, reacting $1.25; Isle Royale, $5 to $26.25, reacting $1.25. United States has been heavy at from $23.87½ to $25, on what is thought to be an accumulation of the stock. Copper Range slid off $1.50 to $61.75, but easily spurted to $66, and closed at $64.50 to-night.

Colorado Springs. Oct. 28.

(From Our Special Correspondent.)

The mining market on the local exchange has been quite steady and with little change in prices, with the latter part of the week showing increased volume of trading. The richest individual shipment ever sent out of the Cripple Creek district was sent from El Paso this week, when about a ton carried values of $75,000. The drainage tunnel, recently constructed in the camp, has been of so much value to the mines in solving the water problem that there is some talk now of constructing a much deeper one, which would drain to a depth of about 2,500 ft. and take care of the water of the camp for many years to come. The mills and samplers of the camp are reported to be receiving more ore and busier than they have been for five years.

El Paso is selling for $1.17¾. Elkton has been very active this week around 69c. Isabella is selling for 20; C. K. & N., for 21; Portland, for $1.65@$1.68. Vindicator sold during the week for 68c. per share.

Salt Lake City. Oct. 29.

(From Our Special Correspondent.)

The trading done on the floor of the exchange the past week was not quite as extensive as during the previous one. However, the condition of the market is little changed. Some stocks have improved in tone, while others have lost ground. Of the latter, Daly-West have suffered most, the stock selling down to $10.75. The cost of extending the Ontario drain tunnel and the connecting up, which will necessarily have to occur, will cost the company a large amount of money; at least 1,800 ft. of new workings will be required to open the orebodies after the Ontario Co. completes the tunnel to the Daly-West side-line.

Consolidated Mercur continues to hold up. The company is earning from $8,000 to $10,000 per month, net, at the present time, and those who have held on to the stock when it was down below the present price are inclined to still hold, in hopes of seeing it advance further, and until the mine enters the dividend list again. The recent strike in the May Day continues to hold out very satisfactory. Notwithstanding the heavy selling during the week by those who had bought in at a lower figure the price has strengthened after a slight relapse. There has been a stiff demand for Victoria, which could not be supplied, while Victor Consolidated was active at 3½@4c. a share. Yankee Consolidated passed the week unchanged. Tetro closed weaker. Improved conditions at the New York Bonanza created some activity in that stock, which sold up to 8½c. per share.

San Francisco. Oct. 27.

(From Our Special Correspondent.)

Quite recently about 20 members of the San Francisco & Tonopah mining exchange joined the San Francisco Stock & Exchange Board, which is the oldest organization of its kind on the coast. Business on the old exchange has been more or less dull for several years, and the prices of seats are very much lower than they were in former days. Dealing in Comstock shares has been at a low point, while the new Tonopah and Goldfield stocks have been very active. When the Tonopah mines were first opened the San Francisco stock exchange declined to list the mines, on the plea that many of them were mere prospects, while others were over-capitalized. The San Francisco & Tonopah exchange was organized in May, 1903, and at once commenced to do an active business. Recently this was increased, especially since the opening of the Goldfield district, and trading is now large in amount. Then the old exchange woke up to the possibilities in the new stocks, and finally induced these members of the new exchange to join the senior board. When these members began to do business, however, they found affairs not at all to their liking; in fact, they could do very little business as compared with the older members. A number of them asked to have their entrance fees returned, but this was refused, and they resolved to forfeit the money and leave the board. Thirteen of them then resigned, and were readmitted to the San Francisco & Tonopah exchange. The members of the old stock board claimed that the new men wanted them to take in all the other members of the Tonopah exchange free; this was refused, and the action brought about the separation. Meantime, the San Francisco Stock & Exchange Board has appointed one of its members, William C. Ralston, formerly president of the California Miners' Association, to visit Tonopah and Goldfield and make some examination into the character and standing of the mines. Mr. Ralston is now in Nevada, and when he returns will report to the board, giving the names of such mines as are considered worthy of being placed on the list.

Trading in the Comstocks was quiet, but prices were steady upon the whole. Some quotations noted were: Ophir, $2.25; Consolidated California & Virginia, $1.30; Hale & Norcross, 61c.; Chollar, 18c. per share.

On the San Francisco & Tonopah exchange business was active, with large sales of several of the leading stocks. Tonopah Belmont sold at 71c.; Goldfield Nevada, 54c.; McNamara, 30c.; Red Top, 14c. per share.

On the California exchange business in oil stocks was very quiet, and the market was rather dull. Twenty-eight sold at $9.75@$10; Reed Crude, $1.60; Apollo, 40c.; Independence, 27c. per share.

Monterey. Oct. 26.

(From Our Special Correspondent.)

Exchange on New York has been dull, and the rise in silver caused exchange to drop from 217 to 216.50.

Mining stocks have been somewhat more active, in sympathy with the demand for Dos Estrellas, which sold as high as $3,015, from $1,200 last July, and occasioned by a reported continued improvement in the ores and a new vein recently encountered. Aldebaran sold for $72.50; Reforma, $32; Providencia, Guanajuato, $115; Barreno, San Luis Potosi, $95, and La Paz, $214. In Pachuca, San Rafael brought $2,100; San Francisco, $95; Santa Gertrudis, $75; Soledad, $1,070; Sorpresa, $305, and Union, $375.

COAL TRADE REVIEW.

NEW YORK, Nov. 2.

ANTHRACITE.

While there is little actual change in the anthracite coal market, the week brings cold weather nearer, with some increase in the buying of domestic stocks. The local yards realize this, and there is an increasing tendency to lay in stocks, with a corresponding improvement in the wholesale trade. Beyond this there is nothing special to record.

The purchase of the controlling interest in the New York, Ontario & Western by the New York, New Haven & Hartford Co. continues to be a topic of discussion. This is natural, since it is the first time in the history of the trade that a New England road has acquired a line of its own into the anthracite country. We have heretofore referred to this matter, and there is little to add, except to say that the New Haven Co. has apparently been for some time past anxious to secure a control of the coal trade in its territory in southern New England, which it could not hold as long as that section received a large part of its supply through the Sound ports, giving the railroad only a short haul. The New Haven Co., in all its operations, has always worked for complete control of business, and it is not likely that the coal trade would be any exception to its general rule.

In Chicago territory the course of trade is about the same, showing an increased disposition to put in stocks, and otherwise prepare for winter.

Prices for prepared sizes continue at schedule rates, $4.75, f. o. b. New York harbor points, for broken, and $5 for egg, stove and chestnut. Demand for the prepared sizes is improving a little, although prices are not yet up to the nominal schedule. Pea coal, for which the schedule price is $3, New York harbor, can be had at about $2.75; buckwheat is quoted at $2.45 for free-burning, and $2.20 for hard, but sales have been made at $2.15 and $1.95 respectively; No. 2 buckwheat, or

rice, has sold at $1.45, or 15c. below schedule rates, while No. 3 buckwheat, or barley, for which there appears to be a good demand, is reported to be selling from $1.30 to $1.35 per ton.

BITUMINOUS.

The Atlantic seaboard soft coal trade has improved, and conditions generally are better than they have been in some time. This is undoubtedly due to the expansion in the fall demand, and, in a measure, to the prevailing low ocean freight rates which have induced consumers to lay in more coal than usual. In the far East trade is active, strengthening prices. There is no relaxation in the transportation service, and shippers are getting prompt delivery to tidewater. Unfortunately, the car supply is inadequate, but it is hoped that the efforts of the railroads will eventually remedy the situation.

Along the Sound trade is good, and, in fact, the demand is better than for a month or two past. At New York harbor little is doing. Prices continue $2.40@$2.50 for ordinary Clearfield coal, f. o. b. New York harbor shipping ports. For the better grades a higher price is asked.

All-rail deliveries are active, and it appears that orders are increasing daily, which rather influences prices.

In the coastwise market vessels are very scarce. Freight rates from Philadelphia are: To Boston, Salem and Portland, 60c.; the Sound, 50c.; Portsmouth, 65c.; Lynn and Newburyport, 75c. portion.

The difficulties between the miners and operators in the Tennessee district has been settled by the general conference held recently in Knoxville, when District No. 19, of the United Mine Workers, voted to accept the operators' offer of a 7% reduction from the mining scale. This means a cut of 3¾c. per ton, the agreement affecting about 6,000 miners. In the Coal Creek section the matter is not finally settled, the operators there holding out for a reduction of 15% in the scale.

Birmingham. Nov. 1.

(From Our Special Correspondent.)

While the strike of the union coal miners in Alabama starts on its fifth month now, the aggregate production of coal in this State continues to add up. Non-union labor, being brought into the district to take the places of the strikers, is not giving the satisfaction that might be asked for, everything considered, but it is serving a purpose and gives promise in a short time of being more efficient. There is a reiteration that the union miners will not be recognized any more as a union. Evan Johns, representing a coal company at Duquesne, Ill., was in the Birmingham district during the past week seeking union miners to move to his State and take up steady work there. The leaders of the union advised their men not to leave this State, and in consequence the Illinois man did not get many to go with him. The union continues to distribute large quantities of provisions among their idle men, while employment at other trades is being secured, and mining corporations recognizing the union and working under a temporary contract are taking on more and more men every week, so that the strike force of 7,500 men is now reduced to 5,000, at the most. Non-union mines in this State are producing large quantities of coal.

W. H. Sayre and associates, of Pennsylvania, interested in the Sayre Mining & Manufacturing Co., owning and operating mines in the western part of Jefferson county, attended a stockholders' meeting in this city last week. Among other business transacted was to increase the capital stock of the company from $150,000 to $200,000, the money raised to be expended in making further development. A new mine will be opened. Mr. Sayre was accompanied to this district by Mr. W. A. Lathrop, of Wilkes-Barre, Pa., president of the Pennsylvania Coal & Coke Co. The latter gentleman was taken on a trip through the Alabama coal section.

G. B. McCormack and Erskine Ramsay, the principal stockholders in the Pratt Coal Co., the company making the heavy development in the western portion of Jefferson county, Ala., and also owners and operators of the Ivy Coal & Coke Co. properties, in Walker county, in the vicinity of Dora (Horse Creek), during the past week, closed the deal for the purchase of the extensive coal properties in Walker county belonging to the Gamble heirs. Included in the deal are the Gamble mines, now being operated under a lease, which lasts three years yet, by the Tennessee Coal, Iron & Railroad Co. The Pratt Coal Co. is getting out nearly 90,000 tons of coal per month.

Chicago. Nov. 1.

(From Our Special Correspondent.)

With the strike at the bituminous mines officially declared on this morning, the local market doubtless will experience a sharp rise in the volume of sales until coal in hand has been reduced. Prices also are likely to rise with any indications of prolongation of the strike. Inquiries and sales were brisk yesterday, in expectation of the step. More than one dealer in western bituminous has expressed the opinion that a short stoppage of mining would be a benefit to a market that has been overburdened with coal for many months. The prospects of a cessation for any considerable time, however, are disquieting.

Sales of anthracite have been fairly good throughout both city and country during the week. Householders in the cities are beginning to put in their winter stocks, and the sales of wholesalers are growing heavier each week, though still not up to the normal for the season. Country trade is increasing, probably more rapidly than city, throughout the territory west and northwest of Chicago. Locally, the business of both retailers and wholesalers is quiet.

In bituminous, the market has been without features, except the anxiety displayed by consumers about the approach of the strike. Dealers express confidence in a speedy adjustment of the labor troubles, and are reassuring their customers. There is still an overplus of fine coal, and the demand for steam coal cannot be called satisfactory. Domestic sizes are steadily increasing in sale. Western lump brings $2@$2.30, and run-of-mine $1.50@$1.75. Hocking and smokeless continue in good demand, of eastern coals, and there is a fair market for Youghiogheny and Pittsburg.

Cleveland. Nov. 1.

(From Our Special Correspondent.)

The coal trade has been rather slow during the past week. The improved tone did not seem to last and prices have eased off a little. This situation is perhaps only temporary, as all indications otherwise are for large consumption. Prices have held firm at $1.05@$1.10 at the mines for both Ohio and Pittsburg coals. The demand for slack is improving to a certain extent, with the prices steady. The quotations generally are 30@35c. at the mines. The domestic and the lake coal situations are without change.

The best demand comes from coke users. The market has stiffened under the steady demand for foundry, until prices are now steady at $2.25 for that material, with some of the ovens holding for $2.50. The fact that the Frick people are supposed to have taken over the output of the Oliver ovens gives tone to this report. Furnace coke is now selling on a basis of $2 at the oven, with the demand steady, although there is little difficulty in finding the material when needed. The strength of the whole coke market has been phenomenal.

Pittsburg. Nov. 1.

(From Our Special Correspondent.)

Coal.—Prices are higher this week, and a stiff advance is likely to be ordered this week. The ruling quotations at the opening of the week were as follows: Run-of-mine, $1.15; ⅛-in., $1.25; 1¼-in., $1.35; slack, 50c., all f. o. b. mine. It was predicted to-day that if the trouble in the Illinois coal-fields is not speedily adjusted, that 35c. a ton will be added to the above prices. The mines in the Pittsburg district, both river and rail, operated very satisfactorily last week, although there was a shortage of railroad cars the latter part of the week. The first coal ever brought out of the upper Monongahela river reached the harbor here yesterday. It was mined in the Thirteenth pool by the Big Falls Coal Co., of Beechwood, W. Va. The completion of the slackwater system between Morgantown and Fairmont resulted in the company developing coal lands along the upper Monongahela. The first fleet brought down consists of six flats. If a market cannot be found for the coal here, the company will re-load it into railroad cars at the West Side Belt Line branch of the Pittsburg terminal of the Wabash and ship it to the lakes. Another mine is to be opened in the upper field by the Lowsville Coal Co.

Connellsville Coke.—The production for the week shows a decrease of over 16,000 tons, but the shipments were greater than the previous week. Heavy buying by the United States Steel Corporation has resulted in higher prices for all grades of coke. Furnace coke is reported firm at $1.75 a ton, and foundry ranges from $2.15 to $2.25. The production for the week amounted to 189,577 tons, and the shipments to 9,234 cars, distributed as follows: To Pittsburg and river points, 3,290 cars; to points west of Pittsburg, 4,524 cars; to points east of Everson, 1,420 cars. This was an increase of 219 cars compared with the shipments of the previous week.

San Francisco. Oct. 27.

(From Our Special Correspondent.)

There is nothing new to report in the local coal trade. Prices are unchanged.

For Pacific Coast coals, in large lots to dealers, quotations are: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, also in large lots to dealers, prices named are $8.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside; Colorado anthracite brings $14. For Eastern coal, quotations are largely nominal, supplies being light. Pennsylvania anthracite is $14 and Cumberland $13. For English coal, quotations are ex-ship: Welsh anthracite, $13; Cannel, $8.50; Wallsend and Brymbo, $7.50 per ton.

Foreign Coal Trade. Nov. 2.

Exports of coal and coke from the United States, for the nine months ending September 30, are reported by the Bureau of Statistics as follows, in tons:

	1903.	1904.		Changes.
Anthracite	1,698,582	1,781,562	I.	82,980
Bituminous	4,615,607	4,687,808	I.	72,201
Total coal	6,314,189	6,469,370	I.	155,181
Coke	311,197	392,929	I.	81,732
Totals	6,625,386	6,862,299	I.	236,913

Exports of coke were chiefly to Mexico and Canada. The coal exports were distributed, as shown in the table below:

	1903.	1904.		Changes.
Canada	5,053,902	4,956,898	D.	97,004
Mexico	613,631	686,291	I	72,660
Cuba	285,325	342,483	I.	57,158
Other West Indies	159,973	186,859	I.	26,886
France	3,320	9,770	I.	6,450
Italy	38,228	66,047	I.	27,819
Other Europe	19,617	48,881	I.	29,270
Other countries	140,199	172,141	I.	31,942
Totals	6,314,189	6,469,370	I.	155,181

Canada is naturally our largest customer, especially for anthracite. The exports to Canada were as follows:

	1903.	1904.		Changes.
Anthracite	1,676,769	1,759,745	I.	82,976
Bituminous	3,377,133	3,197,153	D.	179,980
Totals	5,053,902	4,956,898	D.	97,004

Exports to all other countries show increases, especially to Italy and some other European countries.

Imports of coal into the United States, for the nine months ending September 30, were as follows:

	1903.	1904.		Changes.
Canada	1,225,294	902,031	D.	323,263
Mexico	5	221	I.	216
Great Britain	1,243,199	87,525	D.	1,155,674
Other Europe	382	50		332
Australia	303,626	155,500	D.	148,126
Japan	50,784	41,378	D.	9,406
Other countries	1,019	759	D.	260
Totals	2,824,309	1,187,464	D.	1,636,845

Of the coal imported this year 44,424 tons were classed as anthracite, the balance being bituminous coal. The imports this year were

chiefly on the Pacific Coast. The Japanese coal is imported by way of the Philippines.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, undar date of October 22, that the Welsh coal market continues flat and Monmouthshires are weaker. Quotations are: Best Welsh steam coal, $3.54; seconds, $3.36; thirds, $3.24; dry coals, $3.30; best Monmouthshire, $3.06; seconds, $2.94; best small steam coal, $2.04; seconds, $1.80; other sorts, $1.62.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

The outward freight market remains steady, and rates for the Italian ports are firmer. Some rates quoted from Cardiff are: Marseilles, $1.40; Genoa, $1.26; Naples, $1.26; Las Palmas, $1.32; St. Vincent, $1.44; Rio, $2.10; Santos, $2.46; Buenos Aires, $1.80.

IRON TRADE REVIEW.

NEW YORK, Nov. 2.

Reports from all quarters show a strong and advancing market. Consumers have apparently made up their minds that there is going to be a good demand, and orders for pig iron have multiplied during the week, sales being generally on a somewhat higher level than has recently prevailed. Furnaces are, therefore, inclined to hold back, and are reluctant to make contracts for deliveries beyond the first quarter of 1905, hoping for a further advance. The southern furnaces are especially stiff in this respect, and the large companies there are not inclined to make sales at all just now.

Reports continue to prevail that the United States Steel Corporation has some plan on hand for controlling the pig iron market, probably through large purchases from outside furnaces. It is impossible, however, to ascertain anything definite. One thing certain is, that the Corporation has made considerable purchases of coke from outside concerns. The Jones & Laughlin Steel Co. has recently bought a good deal of iron from outside parties, but this is due to peculiar circumstances. The company has been unable to operate its Eliza furnaces in Pittsburg to their full capacity, on account of the litigation over the alleged nuisance caused by furnace dust. It is even possible that it will be necessary to close down those furnaces altogether, unless a supply of some other than Mesabi ores can be secured.

The situation is undoubtedly a strong one, but at the same time there is some danger that a speculative tendency, which is already manifest, may be developed, and an attempt made to force up prices to a point which will check the increasing consumption.

In finished material generally the situation is also a strong one. In plates and bars heavy consumption is reported, and there is some talk of advances in prices, which will probably materialize very soon. In steel billets a premium is being paid for short deliveries, and it is probable that the Billet Association also will advance prices. Upon the whole, the situation of the market is strong, but the tendency may be—as it frequently is at such times—to go a little too fast and bring about a consequent reaction.

Exports and Imports.—Exports of iron and steel, including manufactures, from the United States, for September and the nine months ending September 30, are valued by the Bureau of Statistics of the Department of Commerce and Labor as below:

	1903.	1904.	Changes.
September...	$7,293,250	$11,150,815 I.	$2,857,565
Nine months	72,714,360	92,565,937 I.	19,851,577

The gain for September was 39.2%; for the nine months it was 27.3%. The exports for the month were above the average. The principal items of the exports were as follows, in long tons:

	1903.	1904.	Changes.
Pig iron	11,982	36,428 I.	24,446
Bars	29,068	42,138 I.	13,070
Rails	11,611	272,696 I.	261,085
Sheets and plates	13,440	29,568 I.	16,128
Structural steel	22,565	37,312 I.	14,747
Wire	76,234	81,127 I.	4,893
Nails and spikes	30,783	30,297 D.	486

The largest increase was in steel rails. Of the rails exported this year, 137,962 tons went to Canada; 49,031 tons to Asia; 25,747 tons to Japan; 21,867 tons to Mexico, and 16,796 tons to South America.

Exports of iron ore were 53,567 tons in 1903, and 129,740 tons in 1904, an increase of 76,173 tons, which was largely due to special exports of Lake Champlain ore to Germany.

Imports of iron and steel into the United States for September and the nine months ending September 30 are valued as follows:

	1903.	1904.	Changes.
September....	$2,362,709	$1,841,175 D.	$521,534
Nine months..	34,652,234	16,591,000 D.	18,061,232

The decrease in September was 22.1%; for the nine months it was 52.1%. The heavier imports in 1903 were in the earlier months of the year, and were largely of pig iron, billets, blooms and other raw, or semi-finished, material. The chief items of these imports were as follows, in long tons:

	1903.	1904.	Changes.
Pig iron	547,386	60,627 D.	486,759
Billets, blooms, etc	243,211	8,849 D.	234,362
Scrap iron and steel	74,103	15,057 D.	59,046
Bars	31,916	15,784 D.	16,132
Wire-rods	15,319	14,034 D.	1,285
Rails	87,273	34,231 D.	53,042
Tin-plates	36,212	56,035 I.	19,823

The only increase was in tin-plates, and this was largely due to the use of foreign plates this year in the oil trade, where a rebate on the cases is allowed when the oil is exported.

Imports of iron ore for the nine months were 836,417 tons in 1903, and 294,203 tons in 1904, a decrease of 542,214 tons, or 64.8%, this year. The decrease was almost entirely in Cuban ore.

Birmingham. Nov. 1.

(From Our Special Correspondent.)

Pig iron quotations in the Southern territory, the Birmingham district in particular, are strong and inclined to approach $12 per ton for No. 2 foundry. Some announcement has been made of a sale of a small lot above that price already, but inquiry fails to elicit definite information, and nothing better than $11.50@$12 for No. 2 is a positive price. There is but little iron purchasable right now in the territory for immediate delivery, and the top-notch price is being asked for such iron. The best authority has it that so far there has not been a very great amount of iron sold for delivery during the first quarter of the coming year, though there has been a steady inquiry. Some of the smaller companies in this district, and one large company in particular, are pretty well sold up. The Sloss-Sheffield Steel & Iron Co. and the Alabama Consolidated Coal & Iron Co. are in a better position to sell iron than any others in this section; both of them have a quantity of iron on hand, held for better prices.

The production during the past week was a little off again, the Tennessee Coal, Iron & Railroad Co. having to bank fires in two furnaces on account of the scarcity of labor and the fuel situation. The Sloss-Sheffield Steel & Iron Co. expects to be making iron at No. 1 city furnace this week. The Tutweiler Coal, Iron & Railway Co.'s furnace, at Vanderbilt, is practically completed.

The following quotations are given: No. 1 foundry, $12.50; No. 2 foundry, $11.50@$12; No. 3 foundry, $10.50@$11; No. 4 foundry, $10 @$10.50; gray forge, $9.50@$10; No. 1 soft, $12.50; No. 2 soft, $11.50@$12.

The Republic Iron & Steel Co. this week resumed operations at the Gate City rolling mills. The plant was idle since July 2. Between 300 and 400 men are given employment. The Republic Co. now has both the Birmingham and Gate City rolling mills in operation, making four mills in all in this section.

Chicago. Nov. 1.

(From Our Special Correspondent.)

A heavy business has been done in the last week in both northern and southern pig iron, sales probably aggregating 75,000 tons for the Chicago district. Prices have jumped to $12@ $12.25, Birmingham, for southern, which means $15.65@$15.90, Chicago, and $15@$15.25 for northern. These prices represent $1 advance on southern within the week, and have caused elation to sellers, though there are conservative sellers who do not regard the sharp rise as permanently established. The explanation of the situation seems to be a feeling by users of iron that there is nothing to be apprehended from the presidential election and its results, and the usual eagerness of everybody to get in on a rising market before the price goes higher.

A peculiar feature of the week has been the lack of demand for spot iron. This, too, may be taken as indicative of confidence in the stability of future business, as spot lots have been in demand most, when the prospects of pig iron were most doubtful. Sales are largely for the first quarter of the coming year, though some are running over into the second quarter.

The opening day of a new week indicates that the activity of last week will continue and that prices are likely to take another jump. With this hopeful condition for the makers of pig iron goes a feeling of uncertainty, approaching uneasiness in some quarters, about the possibilities of coke deliveries. Coke is active, and Connellsville is quoted at $4.65 as a minimum.

Cleveland. Nov. 1.

(From Our Special Correspondent.)

Iron Ore.—The reports are that the Ore Association is to be re-formed during the coming winter, and that the output and the prices will both be regulated by that organization next year. The good demand which is now in sight, and the promise of a better market tend to soften the competitive spirit and to get the producers in line to work in harmony. At present the movement is free and the demand steady and on the increase. Lake rates are unchanged. There is no possibility of a shortage this year.

Pig Iron.—The buying of pig iron has been phenomenally heavy. Foundry iron producers are about sold up for this year and are chary about making extended contracts for next year. The general sales of No. 2 foundry are at $14, with some iron going at $14.50, and with one small lot sold at $15. The last sale was extraordinary and hardly has an influence upon the general situation. The market is now looking toward $15 as a general quotation upon pig iron, and it is not an impossibility within the next few weeks. The furnaces are refusing to make long-time commitments at the present prices. There has been some buying of malleable at $14.50 in the Valleys, with sales of both bessemer and basic at $14. which is the price generally. Some of the furnaces have refused to make any more sales at any such prices. The market as a whole is strong.

Finished Material.—There has been good buying of ship material, structural and plates. The American Co. alone has bought upwards of 35,000 tons, and will be in the market soon for close to 10,000 tons more. The other companies are also buying now, and the market finds a steady demand for all that comes out. The outlook is so good that most of the companies are refusing to make sales beyond the first quarter. There has been also good buying of bars. Contracts covering 5,000 to 7,000 tons have come into the market lately on bessemer steel, and the price has stiffened but has held reasonably firm at 1.30c., Pittsburg. There has been better buying of rails also. One lot of 4,000 tons of standard rails has been reported sold and still larger lots of light rails have been reported. The price of light rails is advanced $1 a ton, and the buyers of standard are not talking about a guarantee as to prices. The market is beginning to look very good. The market for sheets has been fairly strong, but there is nothing extraordinary about it. Prices are steady. Bar iron prices are strong, being supported by the prices of scrap more than by any condition inherent in the market.

New York. Nov. 2.

Pig Iron.—Activity and strength continue. Several foundries have been in the market for large lots, and there are plenty of inquiries. Prices are a shade higher, and sellers are not anxious to take orders for long deliveries at current rates. For Northern iron, we quote: No. 1X foundry, $15.25@$15.50; No. 2X, $15@ $15.25; No. 2 plain, $14.50@$14.75; gray forge, $13@$13.25. Some Virginia basic has sold around $14.50. Southern iron is held high, and sellers apparently are not anxious for bids.

No. 1 foundry, on dock, is held at $16.25; No. 2, $15.75; No. 3, $15.25; No. 4, $15; No. 1 soft, $16; No. 2 soft, $15.75. Around $13.75 is asked for gray forge.

Bar Iron.—Market is stronger, and an advance in prices is expected. We quote refined bars at 1.445c. in carload lots delivered at Jersey City. Soft steel bars can be had for 1.40c. Store trade is very good.

Plate.—Buying has improved. We quote 1.545c. for ¼-in. tank plate in carloads at tidewater, with other grades in proportion.

Structural Material.—There is some improvement in the market. We quote on large lots at tidewater, 1.55@1.80c. for beams, angles and channels. Quite a business in small lots is reported.

Steel Rails.—Quotations are still $28 for standard sections, f. o. b. mills in lots of over 500 tons. There is no business doing. Light rails are quite active. Central Pennsylvania mills ask $21 for 40-lb. and $24 for 16-lb. rails.

Philadelphia. Nov. 2.

(From Our Special Correspondent.)

Pig Iron.—Very large sales of pig iron have been made during the past week, and there is no sign of declining interest in the market. The feature has been the magnitude of many of the individual orders. There is a little apprehension, of course, that a speculative feeling may manifest itself and unnecessarily drive prices to a higher level. The increase in the price of coke is already causing some concern, and, in fact, has arrested some dealings within a day or two, which but for this change would have been consummated. The larger buyers are pretty well supplied for the present, but if they thought a speculative movement was threatening, they would probably add to their purchases of iron to be delivered later on in the spring. Basic iron has been quite active, several large orders having been placed within a few days. Mill irons have been aroused from their sluggishness, and while the smaller mills are buying in a cautious way, the aggregate of transactions is quite heavy. Some little low phosphorus iron has also been purchased and more is in negotiation to-day. No. 1X foundry happens to be quiet; but No. 2 is still moving and is under active inquiry for mid-winter delivery. It is a little difficult to give exact quotations to-day on account of the speculative tendency referred to. All makers are anxious to sell winter delivery iron at the very best price, and some people are asking more money than they really expect to get. Quotations for No 1X foundry are not far from $15.50@$16; No. 2X foundry, $15@$15.25; No. 2 plain, $14.50@$15; standard gray forge, $14.25; basic iron, $14@$14.50; low phosphorus, $19.

Structural Material.—A steady improvement is noted in all kinds of shapes, especially in small angles, which are quoted at 1.55. The orders that have come in during the past week have not been very large individually, but the sum total shows that there is a general improvement.

Scrap.—The larger users of scrap are on the warpath for the kind they want, and they find it no easy matter to fill their yards at quotations prevailing a month ago. Dealers are industriously on the hunt for supplies to meet the requirements of their customers. No 1 steel scrap is worth $14.50; railroad, $16.50; machinery, $13.50; low phosphorus, $17 per ton.

Pittsburg. Nov. 1.

(From Our Special Correspondent.)

The increased demand and higher prices for pig iron have been followed by an advance in billets and sheet-bars. A sale of 3,000 tons of bessemer billets, at a premium of 50c. a ton over the pool price, is reported to-day. While the details were not made public, the report is credited, and the only surprise expressed was that the tonnage had been obtained at so low a price. Some makers are holding billets at $1 a ton and more above the pool price. A meeting of the committee of the Billet Association is scheduled to be held this week in Pittsburg, at which, it is said, the price will be advanced from $19.50 to $20.50 or $21.50, Pittsburg. A representative of a large steel interest declared that prices should not have been reduced. All raw materials are in demand, and prices much firmer, but so far there has been no substantial increase in the prices of finished products. Additional interest in the pig iron market was excited this week when it became known that the Jones & Laughlin Steel Co. had closed some options on bessemer pig iron that it had obtained about two weeks ago. Altogether 18,000 tons were bought, 12,000 tons at $12.50, and 6,000 at $12.75, Valley furnaces. It has options on a larger tonnage, according to reports, but at a higher figure. This large independent steel interest is known to have from 85,000 to 100,000 tons of bessemer iron in stock, and the purchase of outside iron caused some surprise. It is explained that the furnaces of the company in the city limits are running to only about two-thirds capacity. An injunction was obtained some time ago restraining the company from operating its furnaces and scattering ore-dust over a large residence section of the city. In order to comply with the order of court, the furnaces are not operated to capacity. Citizens in the neighborhood contend that the nuisance has not been abated, and threaten contempt proceedings. If the company is forced to close its furnaces it will require a large tonnage of outside iron, as there are many orders for various lines of steel products on the books. Definite information regarding the plans of the United States Steel Corporation cannot be obtained, although it is understood the Corporation is interested in a project that will give it control of the pig iron production. The report that the corporation is a heavy buyer of coke has been confirmed, but the only result so far is in the advance in prices. Furnaces also are large buyers of coke, and shipments during the week were very heavy. Three blast furnaces were blown in yesterday, one of the La Belle Iron Works, at Steubenville; another was the furnace of the Ohio Iron & Steel Co., at Lowellville, O., and the third was the furnace of the Struthers Furnace Co., at Struthers, O. Indications of further improvement in the iron and steel market is shown in the refusal of producers to sell as far ahead as formerly, and the absence of shading in any line in order to obtain business. A few weeks ago it was believed the price of steel rails for next year's delivery would be fixed at a lower rate than has prevailed for the past three years, but it is now regarded as doubtful if any change will be made. The Steel Rail Association will meet some time this month to act on a number of inquiries. With billets at $2 or higher, and pig iron rapidly going up, rail prices are not likely to be disturbed. The leading bar iron interest has advanced the price of iron bars from 1.30 to 1.35c., and other advances are likely to be ordered. Manufacturers are reluctant to give out information as to improvement in trade, giving as a reason that it might lead to exaggerated reports and cause the impression that a fictitious market was being created in order to influence the election. "Wait until after the election," said a prominent manufacturer to-day, "and we will not hesitate to give some very encouraging information on the future of the iron and steel trade." The railroads are evidently preparing for a heavy freight traffic, as nearly every road centering in Pittsburg during the past week has placed additional orders for cars. The three steel car producers, it is estimated, have orders on their books amounting to over 25,000 cars. The makers of wooden cars and steel underframed cars also have heavy orders.

The National Tube Co. caused some surprise by ordering another advance of $2 a ton, effective to-day. An unusually heavy demand is given as the reason for the increase. The company advanced prices $2 a ton on October 19, and the latest increase practically restores prices to what they were last spring.

Pig Iron.—Prices for all grades of pig iron are higher this week. The minimum quotation for bessemer for any delivery is $13, Valley, and $13.25 is named for next year. Foundry No. 2 has advanced, and sales within the past few days have been made at $14.35@$14.50, Pittsburg. Gray forge is quoted at around $13, Pittsburg. Sales of foundry and forge have not been large, but sales of bessemer closed during the week aggregate about 35,000 tons. A number of inquiries are in, but furnaces do not seem anxious to sell at present, as it is believed prices are destined to go much higher. The Lackawanna Steel Co. is still in the market for bessemer iron, having closed for but a part of its requirements last week.

Steel.—The steel market is firm, and prices are about to be advanced. A sale of 3,000 tons of bessemer billets is reported at a premium of 50c. above the pool price. An advance of $1 or $2 will likely be ordered at a meeting of the billet committee scheduled to be held this week. Sheet-bars also will be advanced. Steel bars remain at 1.30@1.35c., and plates at 1.30@1.40c.

Sheets.—The demand has improved, and while prices have not been increased, all shading has disappeared. Some mills are not willing to quote for delivery after January 1. The prevailing price for No. 28 gauge black sheets is 2.10c., and for galavnized 3.10@3.15c.

Ferro-Manganese.—There is no change in the market, 80% domestic still being quoted at $40@$41 per ton.

CHEMICALS AND MINERALS.

New York, Nov. 2.

Trade is somewhat quieter, but the influence from the national election is not as marked as in former years, and deliveries on regular contracts do not indicate a future retrenchment. Prices generally are firm.

Raw materials command some attention, and while foreign brimstone has strengthened in the primary market, New York quotations remain unchanged, for reasons well understood. The Louisiana mines will ship this week from New Orleans the largest single cargo of sulphur—7,500 tons—ever consigned to New York. These mines are shipping about 800 tons daily, and one day recently reported 860 tons. Pyrite charters from Huelva, Spain, to Southern ports continue to be made, and the latest are on a basis of 9s. 6d.@10s. 9d. ($2.28@$2.58 per ton), equivalent to about 50% of the selling price. In nitrate of soda the situation is bullish, and importers are not inclined to persuade consumers to purchase at ruling prices, because a higher market is anticipated by the better statistical position. Returns of the nitrate companies for the year ending June 30 last are coming to hand, and already a fair idea of the prevailing prosperity in the industry may be had from the dividend of 22%, declared by the Santiago company, and the application of £33,377 (more than two-thirds of the gross earnings) by the Amelia company to the cancellation of its debentures.

In phosphates shippers complain of the scarcity of cars. In Florida interest has centered in the acquisition of the plants of the Levy County Co. at Eva, the J. W. Chiles property at Fort White, and the Compagnie des Phosphates de Floridienne at Floral City by the Dutton Phosphate Company. Another feature is the expected early completion of the electric plant on the Withlacoochee river, which will supply electric power for working and lighting the mines and plants in and around Dunnellon. It is reported that the people interested in this enterprise are affiliated with the Camp Phosphate Company, which is erecting a new plant below Dunnellon, to be the first to use electric power in this section.

The foreign trade of the United States, in the nine months ending September 30 this year, is shown below:

	Imports.	Re-exports.	Entered for consumption.
Asphalt, tons	84,444	1,604	82,840
Bleaching powder, lb	65,869,626	1,434	65,868,192
Brimstone, tons	108,836	1,493	107,343
Cement, lb.	279,537,526	11,954,612	267,582,914
Chlorate potash, lb.	83,427	3,664	79,763
Clay or earth, tons	146,579	172	146,407
Graphite, tons	9,791	4	9,787
Nitrate of soda, tons	220,368	4,358	216,010
Phosphates, tons	78,283	.....	78,283
Pyrite, tons	290,752	.....	290,752
Salt, lb.	252,783,968	2,088,534	250,695,434
Saltpetre, lb	10,151,659	789,650	9,362,009
Soda ash, lb.	15,021,656	23,498	14,998,158
Soda, caustic, lb	1,846,533	916,916	929,617
Soda, sal, lb.	3,840,528	12,028	3,828,500

Exports of domestic products in the same period of this year and last year were:

	1903.	1904.	Changes.
Cement, bbl.	191,045	427,910	I. 236,865
Copper sulphate, lb	17,378,945	24,990,195	I. 7,611,250
Gunpowder, lb	662,350	375,305	D. 287,045
Lime, bbl.	42,526	53,590	I. 11,064
Lime, acetate lb	46,045,652	48,876,672	D.2,168,980
Phosphates tons	585,789	653,682	I. 67,893
Salt, lb.	16,797,129	20,050,051	I. 3,252,922

Imports were principally from Great Britain and Germany; exports mostly to Central and South America, and the West Indies.

Evidently the Americans interested in asphalt mining in Venezuela are not yet through with their troubles, by reason of the appointment of a receiver for the New York & Bermudez Co. by the Castro government. Recently the Venezuelan Court of First Instance rendered a decision adverse to the New York company, which is endeavoring to evade the payment of a heavy fine for alleged fostering of the Matos revolution. Of course, the case will be appealed to the High Federal Court, but it is not expected by outsiders that a favorable decision will be rendered. Besides, the State Department at Washington refuses to interfere until all the facts are learned.

Quotations for wholesale quantities are as below, f. o. b. New York, unless otherwise specified:

Brimstone, Domestic 2ds, long ton	$21.20
Domestic 99.5% long ton	21.50
(For Baltimore and Phila. add 25c.; Portland, 15c.)	
Foreign 2ds, long ton	21.50
Foreign 3ds, long ton	20.875
Pyrite, Am. 42@44%, lump, unit, at shipping port	10@10½c.
Am., fines, unit, at shipping port	8½@9c.
Spanish, 46@52%, lump, unit	10@11½c.
Spanish, fines, unit	9@10c.
Nitrate of soda, 95%, 100 lb	2.275@2 30
96%, 100 lb	2.30@2 32½
Sulphate of ammonia, gas liquor, 100 lb	3.025@3.10
Bleaching powder, prime, 100 lb	1.20@ 1.25
Cyanide, lb.	19@20c.
Copper sulphate, 100 lb.	4.75@ 5.00
Nitric acid, 36°, 100 lb.	4.75
38°, 100 lb.	4.75
40°, 100 lb.	5.00
42°, 100 lb.	5.50
Oxalic acid, com'l, 100 lb	5.00@5.375
Sulphuric acid, 50°, bulk, ton	13.50@14.50
60°, 100 lb.	1.05
60°, bulk, ton	18.00@20.00
66°, 100 lb.	1.20
66°, bulk, ton	21.00@23.00
Phosphate, Fla. rock, 77@80%, f.o.b. shipping port	7.25@7.50
Fla. rock, 77@80%, c.i.f. Europe	10.67@11.85
Fla. land pebble, 68@73%, f.o.b. shipping port	3.75@4.00
Fla. land pebble, 68@73%, c.i.f. Europe	7.70@8.40
Tenn. 78@80%, f.o.b. Mt. Pleasant	4.00@4.25
Tenn., c.i.f. Europe	10.27@10.67
Tenn., 78%, f.o.b.	3.75@4.00
Tenn., 75%, f.o.b.	3.25@3.50
So. Car., land rock, f.o.b. Ashley River	3.25@3.50
So. Car., river rock, f.o.b.	3.00@3.25
So. Car., river rock, c.i.f. Europe	6.33@6.56
Algerian, 63@70%, c.i.f.	7.04@7 71
Algerian, 58@63%, c.i.f.	6.15@6.60
Algerian, 53@58%, c.i.f.	5.05@5.20
Tunis, c. i. f.	6.15@6.60
Christmas isle, 80@85%, c.i.f.	13.20@14.03
Ocean isle, 82@88%, c.i.f.	13.60@14.45

Liverpool. Oct. 25.

(*Special Report of Joseph P. Brunner & Co.*)

Soda ash is firm. For tierces, the nearest range is about as follows: Leblanc ash, 48%, £5@£5 10s.; 58%, £5 10s.@£6 per ton, net cash. Ammonia ash, 48%, £4 5s.@£4 10s.; 58%, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under price for tierces. Soda crystals are in request at generally £3 7s. 6d. per ton, less 5% for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda is well maintained at full rates, as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special terms for the Continent and a few other export quarters. Bleaching powder is in quiet demand for export, at about £4 15s.@£5 per ton, net cash, for hardwood packages, as to market.

METAL MARKET.

New York, Nov. 2.

Gold and Silver Exports and Imports.

At all United States Ports in September and year.

Metal.	September.		Year.	
	1903.	1904.	1903.	1904.
Gold:				
Exports	$998,076	$2,744,448	$41,536,851	$83,039,908
Imports	5,184,858	4,241,035	31,640,672	68,694,670
Excess	I. $4,186,782	I. $1,496,587	E. $9,896,179	E. $14,345,238
Silver:				
Exports	2,368,015	3,378,775	24,883,435	39,129,920
Imports	1,687,239	2,003,036	16,601,269	19,677,231
Excess	E. $680,776	E. $1,375,739	E. $8,282,166	E. $19,452,689

Gold and Silver Exports and Imports, New York.

For the week ending October 29 and for years from January 1st.

Period.	Gold.		Silver.	
	Exports.	Imports.	Exports.	Imports.
Week	$3,296,639	$40,458	$188,033	$43,001
1904	76,474,103	5,337,535	31,112,395	877,651
1903	31,547,900	6,698,110	25,931,761	3,135,152
1902	24,755,518	3,258,326	21,920,129	960,446

Of the gold exported this week $2,030,503 went to London, and $1,253,054 to Cherbourg; the silver went chiefly to London. Imports were principally from Central America and the West Indies.

General business seems to be in good condition, notwithstanding the near approach of election. The demand for gold in Europe continues, and it looks as if a considerable amount would go from this country. So far this week a total of $5,000,000 has been taken for export, with a probability that more will go later.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending October 29, gives the following totals, comparisons being made with the corresponding week of 1903:

	1903.	1904.
Loans and discounts	$911,508,500	$1,142,286,600
Deposits	885,616,600	1,204,434,200
Circulation	45,893,900	43,248,900
Specie	164,683,800	238,360,200
Legal tenders	66,994,500	79,542,000
Total reserve	$231,678,300	$317,902,200
Legal requirements	221,404,150	301,108,550
Balance surplus	$10,274,150	$16,793,650

Changes for the week this year were increases of $4,356,200 in loans and discounts, $4,637,500 in deposits, $258,100 in circulation, and $1,954,400 in legal tenders; decreases of $1,855,300 in specie, and $1,060,275 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars, and comparison is made with the holdings at the corresponding date last year:

	1903.		1904.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Ass'n.	$164,683,800	.....	$238,360,200	.....
England	167,068,850	.....	183,101,130	.....
France	483,571,870	$220,902,915	521,770,520	$220,002,605
Germany	168,140,000	59,060,000	163,745,000	57,530,000
Spain	72,600,000	96,220,000	74,135,000	100,170,000
Netherlands	20,307,000	31,689,500	27,604,000	30,263,500
Belgium	16,123,335	8,061,665	16,493,335	8,246,665
Italy	102,425,000	12,016,500	110,210,000	17,121,500
Russia	387,385,000	33,995,000	488,730,000	36,160,000
Austria	230,930,000	61,125,000	241,185,000	60,310,000

The returns of the Associated Banks of New York are of date October 29, and the others October 27, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

Supplies have not been pressing on the market, so with fair inquiry price has been sustained. India continues to purchase, and impression prevails that the government is more or less a buyer.

The United States Assay Office in New York reports receipts of 41,000 oz. of silver for the week.

Shipments of silver from London to the East for the year up to October 20 are reported by Messrs. Pixley & Abell's circular as follows:

	1903.	1904.	Changes.
India	£4,978,030	£8,059,398	I. £3,081,368
China	302,123	372,722	I. 69,599
Straits	721,879	58,103	D. 663,776
Total	£6,002,032	£8,490,223	I. £2,488,191

Receipts for the week were £136,000 in bar silver from New York, £8,000 from Australia, and £2,000 from the West Indies; total, £146,000. Shipments were £90,900 in bar silver to Bombay.

Indian exchange has been stronger, owing to a somewhat unexpected demand for money in that country. The Council bills offered in London were taken at an average of 16.06d. per rupee. At the same time the buying of silver for India has been only moderate.

Exports of gold from Australia for the nine months ending with September are reported as follows, in sterling:

	1903.	1904.	Changes.
Melbourne	£3,479,081	£2,489,849	D. £989,232
Sydney	3,494,478	3,913,187	I. 418,709
Adelaide	50,000	5,000	D. 45,000
Fremantle	5,515,079	5,489,363	D. 25,716
Totals	£12,538,638	£11,897,399	D. £641,239

Of the total this year, £1,050,000 was shipped to San Francisco; £209,158 to China, £700,000 to Germany, £6,647,385 to India, the balance going to Great Britain. The shipments to India this year have been large.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars	$0.46½	$0.47½
Peruvian soles and Chilean pesos	.42	.43½
Victoria sovereigns	4.85	4.87
Twenty francs	3.87	3.90
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

Oct.—Nov.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. Cathodes, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. Cts. per lb.	Spelter. New York, Cts. per lb.	Spelter. St. Louis, Cts. per lb.
27	13¾ @13¾	13¾ @13¾	12¾ @13¾	60½	28½	4.20	5.30	5.15
28	13¾ " 13¾	13½ " 13¾	13 " 13¼	61¼	29	4.20	5.30	5.15
29	13¾ " 13¾	13¾ " 13¾	13¼ " 13½	....	29½	4.20	5.30	5.15
31	13¾ " 13¾	13½ " 13¾	13½ " 13¾	62¼	29½	4.20	5.30	5.15
1	13¾ " 13¾	13¾ " 13¾	13¾ " 13¾	62¾	29	4.20	5.30 @5.32½	5.15 5.17½
2	13¾ " 13¾	13¾ " 13¾	13¾ " 13¾	62½	28½ @29	4.20	5.30 " 5.32½	5.15 5.17½

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

October.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.	Oct.-Nov.	Sterling Exchange.	Silver. New York, Cents.	Silver. London, Pence.
27	4.86¼	58¼	26 1/16	31	4.86¼	58¼	26 1/16
28	4.86¼	58¼	26 1/16	1	4.86¼	58¼	26 1/16
29	4.86¼	58¼	26¼	2	4.86¼	58¼	26¼

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver .925 fine.

Copper continues very strong and advancing. While there was a temporary lull in the European demand, owing to political complications, consumers over here have bought freely for early as well as future delivery. China and Japan also are still in the market for fair quantities. Most of the producers seem to be sold well ahead for some time to come. Under the circumstances, it would seem that present prices are likely to be maintained; the more so, as large quantities of copper will be required for traction purposes. The closing quotations are given as 13¾@13⅞ for Lake; 13⅝@13¾, for electrolytic in ingots, cakes and wirebars; 13⅜@13½, in cathodes; 13⅜@13½, for casting copper.

The market for standard copper in London, which closed last week at £61 15s., opened on Monday at £62 12s. 6d., and the closing quotations on Wednesday are cabled as £62 10s.@£62 12s. 6d., for spot; £62 12s. 6d.@£62 15s., for three months.

Statistics for the second half of October show an increase in the visible supplies of 700 tons. Exports during the month of October amounted to about 26,500 tons.

Refined and manufactured sorts we quote: English tough, £65 5s.@£65 10s.; best selected,

£66 5s.@£66 10s.; strong sheets, £75@£76; India sheets, £72@£73; yellow metal, 6¼@6⅜d.

Exports of copper from New York and Baltimore, in the week ending November 1, were 2,476 long tons. Imports for the week of October 28 were 22 tons.

Exports of copper and copper material from the United States for the nine months ending September 30 are reported as below, by the Bureau of Statistics of the Department of Commerce and Labor, the figures being in long tons of 2,240 pounds:

	1903.	1904.	Changes.
Fine copper	93,884	178,639 I.	84,755
Ore and matte	9,312	12,965 I.	3,653

The increase in exports of fine copper was 90.3% this year. The reports do not give the quantity of copper contained in the ores and matte. Estimating this, however, chiefly on the basis of values, we find that the total exports this year were equivalent to 183,363 tons of fine copper.

The imports of copper and copper material into the United States for the nine months ending September 30 are reported by the Bureau of Statistics as follows, in long tons, the third figure given being the contents of the ores and matte imported in fine copper, and the total representing the equivalent amount of copper in the imports:

Fine Copper:	1903.	1904.	Changes.
Imports	45,027	48,066 I.	3,039
Re-exports	924	350 D.	574
Net imports	44,103	47,716 I.	3,613
Ores and Matte:			
Imports	207,784	185,563 D.	22,221
Re-exports	5,150	..... D.	5,150
Net imports	202,634	185,563 D.	17,071
Contents, fine copper	.....	11,635	.....
Net imports, fine copper	.....	59,351	.....

In 1903 the contents of the ores and matte were not reported. Of the imports this year, 33,297 tons of fine copper and 49,097 tons of ore and matte, containing 5,946 tons of copper—39,243 tons of metal in all—came from Mexico. The imports from Canada were 5,603 tons of fine copper and 127,379 tons of ore and matte, containing 4,795 tons of copper—10,398 tons of metal in all. The only other large exports were 6,043 tons of copper from Great Britain. This, we believe, was largely in the form of copper sent here to be refined.

The totals show that our exports have exceeded the imports this year by 124,012 tons of fine copper.

Tin.—In the absence of any speculative demand, our market here has followed closely the ups and downs of the foreign quotations. Consumers have confined their purchases to nearby deliveries. The closing quotations are 28⅞@29c., for spot; 28¾@28⅞, for futures.

The London market, which closed last week at £132 7s. 6d., opened on Monday at £132 12s. 6d., declined on Tuesday to £131 12s. 6d., and the closing quotations on Wednesday are cabled as £132@£132 2s. 6d., for spot; £131 10s.@£131 12s. 6d., for three months.

Statistics for the month of October show a decrease in the visible supplies of 900 tons.

Imports of tin into the United States for the nine months ending September 30 are reported as follows, in long tons:

	1903.	1904.	Changes.
Straits	15,694	13,456 D.	2,238
Australia	182	247 I.	65
Great Britain	12,347	14,499 I.	2,152
Holland	907	469 D.	438
Other Europe	354	271 D.	83
Other Countries	36	23 D.	13
Totals	29,520	28,965 D.	555

The greater part of the tin received from Great Britain is Straits tin. The metal from Holland is chiefly Banka and Billton tin.

Lead is quiet but steady, without any special feature. The ruling quotations are 4.20, New York; 4.12½, St. Louis.

The foreign market is firm, Spanish lead being quoted at £12 12s. 6d.@£12 13s. 9d., English lead £12 15s.@£12 16s. 3d.

Imports of lead into the United States for the nine months ending September 30, with re-exports of foreign lead, are reported as follows, in short tons of 2,000 pounds:

	1903.	1904.	Changes.
Lead, metallic	1,783	7,017 I.	5,234
Lead in ore and base bullion	77,329	81,096 I.	3,767
Total imports	79,112	88,113 I.	9,001
Re-exports	62,001	67,770 I.	5,769
Net imports	17,111	20,343 I.	3,232

Of the imports this year, 80,285 tons were from Mexico and 6,985 tons from Canada. In addition to the re-exports of foreign lead, given in the table above, there were exports of domestic lead amounting to 52 tons in 1903 and to 84 tons in 1904, showing an increase of 32 tons this year.

St. Louis Lead Market.—The John Wahl Commission Co. telegraphs us as follows: Lead is very strong, and 4.20@4.22½c. has been asked for Missouri brands.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of October 15, that the price of silver has been 14.50 reales per oz. Exchange is lower, at 34.45 pesetas to £1. Local quotation on pig lead has been 68 reales per quintal, which, on current exchange, is equal to £11 0s. 11d. per long ton, f. o. b. Cartagena. Exports for the week were 304,866 kg. argentiferous and 63,900 kg. desilverized lead to Marseilles; 1,500 kg. antimonial lead to Hamburg.

Spelter continues in good demand, and the market is very strong. The closing quotations are given as 5.15@5.17½, St. Louis; 5.30@5.32½, New York.

The foreign market is firm, good ordinaries being quoted at £23 10s., specials at £23 15s.

Exports of spelter, or metallic zinc, from the United States for the nine months ending September 30 were 1,217 short tons in 1903 and 5,747 tons in 1904, showing an increase of 4,530 tons this year. A considerable portion of the exports this year—2,516 tons—were made in the month of September. There have been further quantities exported since the completion of this report in October.

Exports of zinc ore for the nine months were 28,476 tons in 1903 and 21,617 tons in 1904, showing a decrease of 6,859 tons this year.

St. Louis Spelter Market.—The John Wahl Commission Co. telegraphs us as follows: Spelter is very firm at 5.15c., with some of the latest sales reported at 5.20c. East St. Louis.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of October 15, that there has been continued activity, and all the mines are very busy pressing their production to the utmost. Wet weather during the past week has considerably restricted mining operations throughout the province. Exports for the week were 1,800 tons blende to Stettin, and 1,350 tons blende to Antwerp.

Antimony.—Although the demand is nothing out of the ordinary, holders have become somewhat firmer in their views. The closing quotations are given as 7@7¼c. for Cookson's; 6¾@6⅞, for Hallett's; 6⅝@6¾, for Hungarian, Italian, French, Japanese, United States and Chinese.

Imports of antimony into the United States for the nine months ending September 30 are reported as follows, in pounds:

	1903.	1904.	Changes.
Metal and regulus	4,546,233	2,707,854 D.	1,838,379
Animony ore	2,132,534	1,165,574 D.	516,960

This shows a decrease of 40.4% in metal, and of 24.2% in ore, this year.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Exports of nickel, nickel oxide and nickel matte from the United States for the nine months ending September 30 were 1,838,587 lb. in 1903 and 4,581,105 lb. in 1904, showing an increase of 2,742,518 lb. this year. Imports of nickel ores and matte are reported at 3,732 tons in 1903 and 6,387 tons in 1904, showing an increase of 2,655 tons this year.

Platinum.—Quotations are higher, at $19.50 per ounce.

Platinum in manufactured forms is higher. Messrs. Einer & Amend, of New York, quote for different forms, as follows: Heavy sheet and rod, 72c. per gram; foil and wire, 74c.; crucibles and dishes, 78c.; perforated ware, 85c., and cones, $1 per gram.

Imports of platinum into the United States for the nine months ending September 30 were 6,471 lb. in 1903 and 5,442 lb. in 1904, showing a decrease of 1,029 lb. this year.

Quicksilver.—Prices are low. In New York large lots have been offered at $40 per flask (75 lb.), with $41@$42 quoted for smaller orders. The San Francisco price is now $41.50 @$42. London price is £7 15s., with the same quotation from second-hands.

Exports of quicksilver from United States ports for the nine months ending September 30 were 1,013,393 lb. in 1903 and 1,315,423 lb. in 1904, showing an increase of 302,030 lb. this year.

Minor Metals and Alloys.—Thallium is quoted at 60@65 marks per kg. at Breslau, Germany. Manganese metal is quoted at 360 marks per 100 kg., f. o. b. Bremen, Germany. Manganese tin alloy, 55%, is quoted 365 marks per 100 kg. for first quality and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals and their alloys, wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.		Per lb.
No. 1. 99% ingots	33@37c	Ferro-Chrom. (74%)	12½c.
No. 2. 99% ingots	31@34c	Ferro-Tungsten (37%)	45c.
Rolled Sheets	4c. up	Magnesium, pure	
Alum-bronze	20@23c.	(N. Y.)	$1.60
Nickel-alum	33@39c.	Manganese, (98@99%	
Bismuth	$2.10	N. Y.)	75c.
Chr'm'm, pure (N.Y.)	80c.	Manganese, Cu., (30@70%	
Copper, red oxide	50c.	N. Y.)	40c.
Fe.-Molybd'm (50%)	$1.00	Molybdenum, (98@99%	
Ferro-Titanium (20@25%		N. Y.)	$2.75
N. Y.)	75c.	Phosphorus, foreign	45c.
Ferro-Vanadium, (25%		Phosphurus, American	70c.
N. Y.)	$3.00	Sodium metal	50c.
		Tungsten (best)	$1.25

Differences in price depend chiefly upon size and conditions of order.

Missouri Ore Market. Oct. 29.

(*From Our Special Correspondent.*)

The highest price reported paid for zinc ore was $44.50 per ton, an advance of 50c. only, yet on some bins the advance was $1 per ton, and on at least one bin there was an advance of $3 per ton. The assay basis is $38 to $44.50 per ton. The past week is the first time since the beginning of zinc mining in this section of the world that an effort on the part of as large a purchasing company as the Edgar Zinc Co. to break prices resulted in an advancing market, but such is the actual condition at this time, so strong is the demand for every pound of zinc ore output. The shipment fell below the previous week 184 tons, on account of a scarcity of cars, several purchasing agents being desirous of loading considerably more ore. The reserve continues sold very close, and it is estimated that all the small lots of unsold ore all over the district will not, combined, amount to a half-dozen carloads, while there is not a bin with even half a car in it that has not been purchased for early delivery next week.

There is still an unchanged lead market greeting the mine operators, and their appreciation was demonstrated by an increased shipment. Price, delivered, $53.50 per ton, against $56 a year ago. Zinc sold a year ago on a basis of $32 to $34 per ton of 60% zinc, with $38 the highest price, notwithstanding spelter was then about a half dollar higher than now.

Following are the shipments for the week and ten months of the year:

	Zinc lb.	Lead lb.	Value.
Webb City-Carterville	2,864,190	606,970	$69,070
Joplin	2,471,450	243,850	55,950
Duenweg	837,570	184,830	21,650
Galena-Empire	911,080	120,750	20,530
Aurora	872,630	9,990	15,260
Alba-Neck	732,740	8,790	14,880
Carthage	443,110	63,030	10,530
Granby	571,680	38,000	7,920
Prosperity	221,690	71,370	6,320
Oronogo	300,340	11,410	6,190
Badger	258,320	9,750	5,680
Zincite	218,580	18,310	4,850
Mitchell-Sherwood	92,650	12,050	2,270
Baxter	114,800	7,080	1,680
Beef Branch	71,860	19,980	970
Stott City	44,030	.....	920
Moseley	44,000	.....	790
Totals	11,070,720	1,426,060	$246,480
44 weeks	436,821,810	55,482,650	8,988,840
Zinc value, the week,	$208,240;	44 weeks,	7,486,290
Lead value, the week,	38,220;	44 weeks,	1,592,180

Average Prices of Metals per lb., New York.

Mo.	Tin.		Lead.		Spelter.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan ...	28.33	28.845	4.075	4.347	4.865	4.863
Feb ...	29.43	28.087	4.075	4.375	5.043	4.916
Mar. ..	30.15	28.317	4.442	4.475	5.349	5.057
April ..	29.81	28.132	4.567	4.475	5.550	5.219
May ...	29.51	27.718	4.325	4.423	5.639	5.031
June ..	28.34	26.325	4.210	4.196	5.697	4.760
July ...	27.68	26.573	4.075	4.192	5.662	4.873
Aug. ..	28.29	27.012	4.075	4.111	5.725	4.866
Sept ..	26.77	27.780	4.243	4.200	5.686	5.046
Oct ...	25.92	28.596	4.375	4.200	5.510	5.181
Nov. ..	25.42	.....	4.218	.....	5.038	.....
Dec ...	27.41	.....	4.162	.....	4.731	.....
Year...	28.09	.....	4.237	.....	5.400	.....

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5.038c.; May, 4.853c.; June, 4.596c.; July, 4.723c.; August, 4.716c; September, 4.896c; October, 5.033c.

Average Prices of Copper.

Mo.	New York.				London.	
	Electrolytic.		Lake.		Standard.	
	1903.	1904.	1903.	1904.	1903.	1904.
Jan ..	12.159	12.410	12.361	12.553	53.52	57.500
Feb. .	12.778	12.063	12.901	12.245	57.34	56.500
Mar. .	14.416	12.299	14.572	12.551	63.85	57.321
April .	14.454	12.923	14.642	13.120	61.72	58.247
May ..	14.435	12.758	14.618	13.000	61.73	57.321
June .	13.942	12.269	14.212	12.399	57.30	56.398
July ..	13.094	12.380	13.341	12.505	56.64	57.256
Aug. .	12.962	12.343	13.159	12.468	58.44	56.952
Sept .	13.205	12.495	13.345	12.620	56 82	57.645
Oct ..	12.801	12.993	12.954	13.118	55.60	60.012
Nov. .	12,617	.....	12.813	.....	56.30	.....
Dec ..	11,952	.....	12,084	.....	56.36	.....
Year..	13.235	.....	13.417	.....	57.97	.....

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Mo.	1902.		1903.		1904.	
	London, Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.	London, Pence.	N. Y., Cents.
Jan ...	25.62	55.56	21.98	47.57	26.423	57.055
Feb ...	25.41	55.09	22.11	47.89	26.665	57.592
Mar...	25.00	54.23	22.49	48.72	26.164	56.741
April..	24.34	52.72	23.38	50.56	24.974	54.202
May...	23.71	51.31	24.89	54.11	25.578	55.439
June ..	24.17	52.36	24.29	52.86	25.644	55.673
July...	24.38	52.88	24.86	53.92	26.760	58.095
Aug...	24.23	52.52	25.63	55.36	26.591	57.806
Sept ...	23.88	51.52	26.75	58.00	26.349	57.120
Oct ...	23.40	50.57	27.89	60.36	26.760	57.923
Nov. ...	22.70	49.07	27.01	58.11	.....	.....
Dec ...	22.21	48.03	25.73	55.375	.....	.....
Year...	24.09	52.16	24.75	53.57	.....	.....

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

DIVIDENDS.

Company.	Payable.	Rate.	Amount.
†Amalgamated C.	Nov. 28	$0.50	$769,420
‡Anaconda Copper .	Nov. 18	.50	600,000
*Annie Laurie	Nov. 12	.50	12,500
*Bunker Hill & Sull.	Nov. 4	.25	75,000
*Central Eureka, Cal.	Nov. 11	.05	10,921
*Daly-West, Utah. .	Nov. 16	.40	72,000
*Dos Estrellas	Nov. 15	4.60	13,800
*Four Oil, Cal.	Nov. 15	.01	2,087
Gold King, Colo.	Nov. 15	.01	9,369
*Imperial Oil	Nov. 6	.20	20,000
*Monte Cristo Oil.	Nov. 10	.01	5,000
‡Mont. Ore Purch	Nov. 14	2.00	162,000
*Natividad, Mex	Nov. 15	5.00	12,000
*Oil City Petroleum.	Nov. 1	.00½	2,500
Penna. Steel, pf	Nov. 1	3.50	588,749
Sierra Buttes, Cal.	Nov. 1	.24	29,400
*Silver King, Utah .	Nov. 10	.66⅔	100,000
*Thirty-three Oil.	Nov. 6	.10	10,000
‡United Copper, pf	Nov. 15.	3.00	150,000
†U. S. Steel Corp., pf.	Nov. 30	1.75	6,304,919

*Monthly. †Quarterly. ‡Semi-annually.

ASSESSMENTS.

Company.	Delinq.	Sale.	Amt.
Alta, Nev.	Nov. 12	Nov. 30	.05
Best & Belcher	Nov. 4	Nov. 25	.10
Big Casino, Cal	Nov. 12	.....	.03
Brunswick Con	Nov. 3	.....	.03
Bullion, Nev	Nov. 11	Dec. 1	.05
Caledonia, Nev	Nov. 21	Dec. 12	.10
California, Utah	Oct. 12	Nov. 26	.06
Con. Cal. & Va.	Oct. 31	Nov. 21	.25
Crown Point, Nev.	Nov. 9	Dec. 1	.10
Golden West, Cal.	Oct. 28	Nov. 28	.01
Gould & Curry	Nov. 25	Dec. 14	.10
Hale & Norcross	Oct. 31	Nov. 30	.10
N. Y. Bonanza	Oct. 18	Nov. 7	.03
Potosi, Nev	Nov. 22	Dec. 13	.10
Puget Sound Iron.	Nov. 17	.....	.10
Red Slide, Cal	Nov. 12	Nov. 30	.05
Santa Eulalia Expl	Nov. 12	.....	.05
S. Nevada, Nev.	Nov. 17	Dec. 7	.10
Trade Dollar, Utah	Oct. 18	Nov. 9	.10
Union Con., Nev.	Nov. 9	Nov. 29	.10
West Comstock.	Nov. 15	.....	.05

NEW YORK.

Company.	Par val.	Oct. 26		Oct. 27		Oct. 28		Oct. 29		Oct. 31		Nov. 1		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Acacia	1							.05						1,000
Amalgamated, C.	100	67½	65½	†65½	64½	68	65½	70½	69	71½	68	71½	68	505,693
Anaconda	25					99½	97	102	100	104½	101½	104½	101	4,400
Anaconda G.	5									.10				1,000
Best & Belcher.	3													
Brunswick	1													
Caledonia	1					.40				.42		.45		600
Chrysolite	50									.05				300
Confidence	3													
Con. Cal. & Va.	2½							2.00						400
Creede&Cripple Ck	1	.03												500
Cripple Creek Con.	1									.09				1,000
Crown Point	1													
Elkton Con	1					.67	.66			.67	.66			1,000
El Paso	1													
Gold Sovereign	1	.66												500
Gould & Curry	1									.17				300
Greene Con.	10	20½	20⅛	20½	20⅛	20½	20⅛	21⅛	20⅞	22½	21½	24½	22½	50,870
Hale & Norcross	3	.64								.71	.70			400
Homestake	100	55½												20
Horn Silver	20					1.65								100
Isabella	1													
Jack Pot	1	.03½				.03½								2,000
Justice	2													
Little Chief	50									.05				200
Mexican	3									1.25		1.35		300
Mollie Gibson	5					.03								500
Moon Anchor	5											.08	.07	1,000
Ontario	100	3.75												100
Ophir	3					2.25		2.65		2.55	2.50	2.70		900
Overman	1													
Pharmacist	1													
Phœnix	1	.18	.17	.19		.17	.16	.16		.16	.15	.16	.14	6,100
Portland	1	1.70				1.70		1.70				1.70		800
Potosi	1	.17												200
Savage	3							.30						500
Sierra Nevada	3									.30				300
Silver Hill	1													
Small Hopes	20													
Standard	10					2.15		2.00						50
Tennessee C.	10			32½	32½	.30	.29	32½	30	32½	31½			2,200
Union Con.	1	.36												200
Union Copper.	25	¼				¼				¼				400
United Copper	100													
Vindicator	1	.65	.64											700
White Knob.	10	⅛				⅛		⅛	⅛	⅛				1,390
Work	1	.08				.08		.07		.07				3,500
Yellow Jacket	1	.18	.17											200

Total sales, 589,623 shares. †Ex-dividend.

SALT LAKE CITY.*

Oct. 29

Company.	Par Val	High.	Low.	Sales.	Company.	Par Val	High.	Low.	Sales.
Ajax	$ 1	.10	.10	100	Mammoth	$ 1	.40½	.39	400
Butler-Liberal	1	.09½	.09½	2,500	N. Y. Bonanza	1	.08½	.07	23,573
Carisa	1	.12	.11½	2,700	Sacramento	5	.10½	.10	1,500
Century	1	.33	.33	100	Silver Shield	1	.07	.05	9,500
Con. Mercur	5	.40½	.39	2,000	Star Con.	1	.18	.16½	3,700
Columbus Con	1	1.40	1.35	825	Swansea	1	.30	.30	1,200
Daly-Judge	20	4.50	4.50	1,600	Tetro	1	.27	.26	2,000
Daly-West	20	12.10	10.75	1,640	Uncle Sam Con.	1	.22	.20	2,925
Little Chief	1	.02½	.01½	8,000	Victoria	1	2.05	2.10	600
Lower Mammoth	1	.13½	.13	1,500	Victor Con.	1	.04	.03½	21,800
May Day	2½	.34	.28½	43,100	Yankee Con.	1	.35	.35	400

*By our Special Correspondent. Total sales, 131,663 shares.

BOSTON, MASS.

Company.	Par val.	Oct. 26		Oct. 27		Oct. 28		Oct. 29		Oct. 31		Nov. 1		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adventure Con	$25	4½	4	4		4½	4⅜	4½	4	4½	4	4½		2,535
Allouez	25	12		11¼		13	11⅜	14⅜	13½	15	14	14⅜	14	17,054
Amalgamated	100	67⅜	65⅜	†65⅜	64⅜	68	65⅜	70½	68⅜	71⅜	68⅛	71	68⅛	52,550
Am. Z. L. & Sm.	25							13						50
Anaconda	25					25½		25½	24½					260
Arcadian	25									1				50
Arnold	25					.75								200
Atlantic	25	15	14½	15½	14	.17	15	.17	16½	17½	15½	16⅜	16	14,283
Bingham Con.	50	32⅜	32½	32⅜	31⅜	33	31⅜	33⅛	33	34⅛	33⅛	34⅛	33⅜	19,619
Bonanza	10					.50		.55						500
Boston Con.	5	7	6½	6½	6	6½		6⅜	6⅛	6½	6⅛	6⅜		4,760
Calumet & Hecla	25	570		590	570	600	595	600		600	595			226
Centennial	25	29½	28½	29	28½	30⅜	29	31½	30½	30⅜	29	29½	29	13,062
Con. Mercur	5			.45	.40	.43	.42	.43		.45	.40	.47	.45	5,000
Copper Range	100	64	62½	62⅜	61⅜	65	63	65⅜	65	66	63	64⅜	62½	26,106
Daly-West	20	12½	12	12	11½	11½	10⅜			12	11	12½	11⅜	2,750
Dominion C.	100	58½				57	56	58		58		58		215
Dominion C. pf.	100					109								1
Dominion I. & S.	100	14	13⅜	14½	14			14⅜	13½	15		14	12½	890
Elm River	12	2½		2⅜		3	2⅜	3⅛	3⅛	3	3	3⅛	3	3,065
Franklin	25	8½		9	8½	10½	9	11	10½	10⅜	10⅛	10½		3,881
Granby Con.	10	3⅜		3⅜		3⅜		3⅜	3⅛	3⅜	3⅛	3⅜	3⅛	18,874
Greene Con. C	10	20⅜	20⅛	20½	20	†20½	20⅛	21⅛	21	22⅛	21⅛	24⅛	22	20,715
Guanajuato Con.	5	2½		2½	2⅛	2½	2⅛			2⅜		2⅜	2⅛	3,435
Humboldt	25													
Isle Royal Con.	25	22½	21	22½	21½	25	22⅛	26	25½	26⅛	25⅛	26	25	12,565
Mass. Con.	25	5⅛	5½	5½	5⅛	5½	5⅛	5⅛	5½	6⅛	5⅛	7⅛	6½	7,026
Mayflower	25					.75	.60	.80		.90	.80			2,560
Michigan	25	9⅛	8⅞	9	8⅜	10	9½	10⅛	10	10⅛	10	10	9⅜	7,081
Mohawk	25	51½	50⅜	51⅛	50½	52⅛	50⅜	53⅛	53	53⅛	51⅜	52⅜	51½	8,552
Mont. Coal & C	25	5⅛	5½	5⅛	5½	6⅞	5½	6	5⅜	6	5½	5⅛	5½	22,020
Mont. & Boston.	5													
Napa	7					.75								10
National	25									2				100
New Idria	5			10										
Old Colony	25	1⅜						1⅜		1⅛	1⅛	1⅜		845
Old Dominion	25	26	23	25⅛	24	27⅛	25½	28⅛	27⅛	28⅛	26	28	26	20,061
Osceola	25	90	89	89	86½	90⅜	88⅜	93	91	94	91½	92	90	4,288
Parrot	10	26⅜		26½	25⅜	27⅜	26⅜	28	27	28	27	27⅛	26	3,332
Phœnix Con	25	1⅛				1⅜		1⅜	1⅛	1⅛		1⅜		480
Quincy	25	1.00	.99	99½	99	100	99	106	99½	108	104	104	103	549
Rhode Island	25					1			1⅛		1⅛			445
Santa Fe	10	1⅛	1⅛			2		2		2		1⅜	1⅛	2,352
Shannon	10	6½	6	6	5⅛	6½	5⅞	6⅛	6⅜	7	6⅛	7⅛	6⅞	24,853
Tamarack	25	118½		118		123½	118	124	123	125	123	122		943
Trinity	25	12½	11½	12⅜	11⅜	14⅛	11⅜	16	15½	18	16⅛	17	14⅛	25,160
Union C. L'd & Mg	25	4½	4⅛					5	4½	4⅛				1,300
United States	10	24⅞	23⅞	24⅛	23⅞	24⅞	23⅞	25	24⅛	25⅛	24⅛	24⅛	24	22,955
U.S.Coal & Oil	25	11⅛	11	11		11⅛	11	11⅛	11	11⅛	11	11⅛	11	1,060
Utah Con	5	43	41⅛	41⅞	41⅛	42⅞	42	43⅞	43	44⅛	43	43⅛	42⅛	19,752
Victoria	25	4⅛	4	4		4⅜	4	4⅜	4⅛	5	4⅛	4⅜	4⅛	8,150
Winona	25	9⅜	9⅛	9½	9	10⅛	9½	12½	11	12⅜	11	11⅛	11	13,711
Wolverine	25	99⅜	98½	99		100	99	100	99½	100		100	99	1,100
Wyandot	25	2⅛		2⅛	2⅛	2⅜	2⅛	2⅛	2⅜	2⅛		2⅛	2⅜	1,915

Total sales, 423,266 shares. †Ex-dividend.

COAL, IRON AND INDUSTRIAL STOCKS.

Company.	Par val.	Oct. 26		Oct. 27		Oct. 28		Oct. 29		Oct. 31		Nov. 1		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allis-Chalmers	$100	14½	14	13½		14		13⅞		14				700
Allis-Chalmers pf.	100							60		60½				200
Am. Agri. Chem	100													
Am. Sm. & Ref.	100	72	70½	71	69½	72½	70½	72½	72½	72½	71½	71⅛	69⅜	58,330
Preferred	100	114	113½	113½	112	112	111½	113	112½	112½		111½	110	4,754
†Cambria Iron	50	46½	46⅛			47	46⅛			47				312
†Cambria Steel	50	24	23½	23⅜	23	23⅞	23½	23⅛	23⅜	24	23⅜	23⅞	23⅜	5,024
Col. Fuel & Iron	100	42½	40½	41⅛	39½	42½	41½	44⅜	42½	44⅞	42	42½	40½	123,315
Col. Fuel & Iron pf	100	70								73	72½			510
Col. & H. C. & I.	100	14½	14	14	13⅜	14½	14	14⅜	14	15	14½			2,850
†Lehigh C. & N.	50	92		90½		92	91	92½	92	92½		92	91	1,517
*Mong. R. Coal	50													
*Mong. R. Coal pf.	50	23½	22⅞			23		23						69
National Lead	100	23⅜	22½	22½	22⅛	24⅛	23½	24½		23⅜		23⅜	23	14,900
Preferred	100			95½		94½						94½		530
†Phila. Nat. Gas.	50	42½	42⅛	42	41½	42½		42⅛	42½	42½	42⅛	43½	41½	4,126
Preferred	50	47										47		109
*Pittsburg Coal	100	16½	16⅛	16½		16½		16½	16⅛	16½		17		982
Preferred	100	71½	70½	71	70⅜			73½	71½	74	73	74⅛	73½	8,296
Republic I. & S.	100	12½	12	11½	11½	11½	11½	12½	12	12⅜	12	11½	11½	6,050
Preferred	100	53⅜	52½	53	52½	52⅜		54	52½	54	52½	53⅜	53	7,250
Sloss-Shef. S. & I.	100	47½	46½	46	45	47½	46½	49⅛	47½	49⅛	47½	47⅛		4,100
Preferred	100	96½						96½	95½	97	96½			800
Standard Oil	100	647		647½	644½	648½		647½	647			647½	647	104
Tenn. C. I. & R.R.	100	57½	55	55⅞	54½	57½	55½	59	57⅝	59	56½	58	55⅜	45,260
U. S. Steel Corp	100	21½	20½	20½	19½	20½	20	21½	21	21½	20½	20½	19½	273,350
Preferred	100	82½	80½	80½	78½	81½	79½	82½	82	82½	80½	81½	79½	622,850
Va.-Car Chem.	100	37	36½	37		39	37½	39	38⅜	39	37½	38½	37½	15,615
Preferred	100	111½	110	111½	109½	111½	110½	112	111½	111½		111	110⅜	3,239

*Pittsburg Exchange; †Philadelphia Exchange; all others, New York Stock Exchange

Total sales, 1,205,242 shares.

STOCK QUOTATIONS.

SAN FRANCISCO.*

Company.	Location.	Oct. 20		Oct. 21		Oct. 22		Oct. 24		Oct. 25		Oct. 26		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
MacNamara	Nev	.32	.30	.30	.27	.26	....	.31	.28	.30	.29	.29	....	41,500
Mont. Tonopah	Nev	2.00	1.95	197½	1.95	....	....	....	....	1.95	....	2.00	....	2,500
Ton. Belmont	Nev	.66	....	.68	.67	.70	.69	.71	....	.75	.71	.73	.72	8,250
Ton. Midway	Nev	.40	....	.40	.39	....	....	.38	....	.38	....	.39	.37	8,300
Ton. Mg. Co	Nev	....	....	....	....	....	....	....	....	9.75	....	9.50	....	200
Ton. North Star	Nev	....	....	.20	.19	....	....	....	....	.19	....	....	....	1,600

*San Francisco & Tonopah Exchange, Total sales, 62,350 shares.

SAN FRANCISCO (By Telegraph).

Company.	Oct. 31	Nov. 1	Company.	Oct. 31	Nov. 1
Belcher	$0.27	$0.25	Gould & Curry	$0.15	$0 16
Best & Belcher	1.15	1.05	Hale & Norcross	.70	.70
Caledonia	.40	.39	Mexican	1.30	1.25
Challenge Con.	.20	.19	Ophir	2.55	2.45
Chollar	.20	.20	Overman	.14	.14
Confidence	.80	.85	Sierra Nevada	.31	.30
Con. California & Virginia	1.85	1.75	Union Con	.43	.41
Crown Point	.09	.08	Yellow Jacket	.19	.19

COLORADO SPRINGS (By Telegraph).

Company.	Oct. 31		Nov. 1		Company.	Oct. 31		Nov. 1	
	H.	L.	H.	L.		H.	L.	H.	L
Anaconda	.12½	.10½	.12	.10½	Jack Pot	.05	.03½	.04½	....
C. K. & N.	.21	.20	.22	.21	Last Dollar	.25	....	....	....
Cripple Ck. Con.	.09	.08½	.08½	.08½	Mollie Gibson	.04	.03	.04½	.03½
Doctor Jack Pot	.04½	.04½	....	....	Moon Anchor	.07½	.05½	.07	.05½
Elkton Con	.69	.68½	.68½	.68½	Old Gold	.09½	.09½	.09½	.08½
El Paso	1.18	1.17½	1.17	1.16	Pharmacist	.03½	.03½	....	....
Gold Dollar	.06½	.06	.06	....	Portland	1.70	1.67½	1.70	1.65
Gold Sovereign	.06	.05½	.06½	.06	Vindicator Con	.70	.66	.70	.65
Isabella	.20½	.20	.20½	.20	Work	.09	.07	....	....

ST. LOUIS, MO.* Oct. 29.

Company.	Par Val.	Bid.	Ask.	Company.	Par Val.	Bid	Ask.
Am. Nettie, Colo	$10	$0.20	$0.25	Columbia Lead, Mo.	$10	$0.25	$1.00
Center Creek	10	1.00	1.50	Con. Coal, Ill	100	15.00	20.00
Central Coal & C.	100	57.00	59.50	Doe Run Lead, Mo.	100	110.00	115.00
Central C. & C., Pf	100	70.00	71.50	Granite Bimet., Mt.	10	.28	.32
Central Lead, Mo	100	110.00	115.00	St. Joe Lead, Mo	10	14.00	15.00

*By our Spceial Correspondent.

DULUTH, MINN.

Company.	Par Val.	Bid.	Ask.	Company.	Par Val.	Bid.	Ask.
Calumet & Arizona	$10	$98.00	$99.50	Lake Sup. & Pitts	$10	$52.50	$53.00
Calumet & Bisbee	10	....	2.00	Pitts. & Duluth Dev	15	78.50	80.00
Calumet & Pittsburg	10	43.00	44.00	Shakespeare	1	....	.20
Higgins Development	10	....	1.00	United Mexican	10	....	.25
Junction Development	15	53.00	53.50	Wolverine & Arizona	10	....	1.50

MONTREAL.* Oct. 28.

Company.	Par Val.	High	Low	Sales	Company.	Par Val.	High	Low	Sales
Dominion Coal	100	58.00	55 00	285	Montreal Steel	100	50.00	35.00	....
Dom. Coal, Pf	100	112 00	110.00	30	Mont'l Steel, Pf	100	....	....	....
Dom. I. & St	100	14.50	13 75	565	Nova Scotia St.	100	63.75	60.00	685
Dom. I. & St., Pf.	100	42.00	40.25	560	N. S. Steel, Pf	100	....	....	....

*Montreal Stock Exchange. Total sales, 2,125 shares.

MEXICO. Oct. 21

Company.	Shares Issued	Prices, Mex. Bid.	Prices, Mex. Ask.	Company.	Shares Issued	Prices, Mex. Bid.	Prices, Mex. Ask.
DURANGO:				Soledad, aviada	$670	$1,100	$1'120
Ca. Min. de Penoles	2,500	$2,600	$3,000	Sorpresa, aviada	960	300	305
San Andres de la Sierra	200	10,000	....	MEXICO:			
GUANAJUATO:				Aldebarren	2,000	79	85
Cinco Senores y Aviadoras	2,000	34	36	Buen Despacho	3,000	60	65
Cinco, Senores y Aviada	400	34	36	Dos Estrellas	3,000	2,980	3,025
Providencia, San Juan de la Luz	6,000	163	175	La Esperanza (El Oro)	3,000	1,500	1,500
GUERRERO:				Santa Ana, Esperanza	2,400	15	30
Garduno y Anexas	7,200	35	40	NUEVO LEON:			
HIDALGO:				La Fraternal	1,000	580	620
Amistad y Con	9,600	70	74	Norias de Bajan	1,000	500	600
Carmen, aviada	1,100	150	170	SAN LUIS POTOSI:			
Guadalupe Fresnillo Mill	1,000	170	200	Concepcion y An	3,000	55	75
GuadalupeFresnillo Mine	1,400	70	80	El Barreno, aviadora	2,000	82	87
Maravillas y An., aviador	1,680	90	110	Sta. Maria de la Paz	9,600	212	214
Maravillas el Lobo	1,000	130	180	ZACATECAS:			
Refugio, aviada	12,800	680	740	Asturiana y An	2,500	10	15
Sta. Gertrudis y An. aviadas	9,600	12	14	Candelaria y Pinos	2,500	38	43
Sta. Gertrudis y An. aviadora	28,800	74½	75	San Carlos y Anexas	2,500	36	42
San Rafael y An., Trompillo	1,200	2,100	2,150	Sta. Maria de Gaud	2,500	82	86
San Rafael y An., aviada	1,200	710	720	MISCELLANEOUS:			
				Bartolome de Medina	2,000	99	102
				Naica (Chihuahua)	100	11,000	13,000
				Natividad (Oxaca) aviadora	1,800	95	100
				San Francisco Hac.	6,000	96	100
				Union Hacienda	3,000	370	380

LONDON. Oct. 20

Company.	Shares Issued.	Par value.	Latest dividend. Amt.	Latest dividend. Date.	Quotations. Buyers.	Quotations. Sellers.
American:		£ s. d.	s. d.		£ s. d.	£ s. d.
Alaska-Treadwell	200,000	5 0 0	4 0	Oct., 1904	4 12 6	4 17 6
Anaconda	1,200,000	5 0 0	2 0	Nov., 1904	4 15 0	4 17 6
Camp Bird	820,000	1 0 0	9	Nov., 1904	1 8 3	1 8 9
Copiapo	112,500	2 0 0	5 0	Oct., 1904	1 0 0	1 5 0
De Lamar	80,000	1 0 0	2 0	Oct., 1904	16 3	18 9
El Oro	1,080,000	1 0 0	9	July, 1904	18 9	1 1 3
Esperanza	455,000	1 0 0	6	Oct., 1904	....	....
Frontino & Bolivia	128,662	1 0 0	3 0	July, 1901	8 6	9 6
Le Roi	200,000	5 0 0	5 0	Nov., 1899	13 9	16 3
Le Roi No. 2	120,000	5 0 0	1 0	June, 1904	11 3	13 9
Palmarejo & Mexican	445,000	1 0 0	rts.	Apr., 1903	8 0	8 6
Standard	500,000	4 0	2½	Sept., 1903	2 0	3 0
Stratton's Independence	1,000,007	1 0 0	6	Dec., 1903	3 6	4 0
St. John del Rey	546,265	1 0 0	6	Dec., 1903	12 6	13 6
Tomboy	300,000	1 0 0	1 0	June, 1902	17 6	1 2 6
Ymir	200,000	1 0 0	1 0	Mar., 1902	2 6	5 0
European:						
Linares	15,000	3 0 0	5 0	Sept., 1904	3 5 0	3 15 0
Mason & Barry	185,172	1 0 0	7 0	May, 1904	2 17 6	3 2 6
Rio Tinto	325,000	5 0 0	32 6	Nov., 1904	58 2 6	58 7 6
Rio Tinto, preferred	325,000	5 0 0	2 6	Nov., 1904	6 2 6	6 7 6
Tharsis	625,000	2 0 0	7 0	May, 1904	4 17 6	5 2 6
West Australian:						
Associated	495,388	1 0 0	2 6	July, 1904	2 2 6	2 3 9
Cosmopo'itan	400,000	1 0 0	1 0	Apr., 1904	6 9	7 3
Golden Horseshoe	300,000	5 0 0	6 0	Nov., 1904	6 18 9	7 1 3
Great Boulder	1,750,000	2 0	9	Sept., 1904	19 9	1 0 3
Gt. Boulder Persever'ce	1,400,007	1 0 0	1 0	Sept., 1904	12 9	13 3
Great Fingall	250,000	1 0 0	7 0	Oct., 1904	7 18 9	8 1 6
Ivanhoe	200,000	5 0 0	5 0	Oct., 1904	7 11 3	7 13 9
*Kalgurli	120,000	1 0 0	2 6	Oct., 1904	5 12 6	5 15 0
Lake View	250,000	1 0 0	1 6	Oct., 1904	1 3 9	1 6 3
Oroya-Brownhill	450,000	1 0 0	3 0	Sept., 1904	3 10 0	3 12 6
Miscellaneous:						
Brilliant Central	100,000	1 0 0	1 0	Oct., 1904	2 0 0	2 5 0
Briseis	600,000	1 0 0	....	....	11 9	12 3
Broken Hill	960,000	8 0	1 0	Aug., 1904	2 1 6	2 2 6
Mt. Lyell	275,000	3 0 0	1 3	June, 1904	10 0	11 0
*Mt. Morgan	1,000,000	1 0 0	3	Oct., 1904	2 12 6	2 15 0
Waihi	497,412	1 0 0	2 6	Sept., 1904	5 15 0	5 17 6
Indian:						
Champion Reef	513,832	10 0	1 4	Sept., 1904	1 11 6	1 12 6
Mysore	566,043	10 0	4 6	Nov., 1904	6 10 0	6 12 6
Nundydroog	484,000	10 0	1 6	Nov., 1904	1 15 0	1 16 3
Ooregum	343,000	10 0	1 3	Aug., 1904	17 6	18 6
Ooregum, pfd	240,000	10 0	4	Aug., 1904	1 6 3	1 8 9
South African:						
Angelo	600,000	1 0 0	7 0	Aug., 1904	6 17 6	7 0 0
Bonanza	200,000	1 0 0	8 0	Aug., 1904	1 2 6	1 5 0
British South Africa	4,436,019	1 0 0	rts.	May, 1899	1 7 6	1 8 9
Cape Copper	300,000	2 0 0	2 6	July, 1904	4 2 6	4 5 0
Cape Copper, pfd	75,000	2 0 0	2 6	July, 1904	4 0 0	4 5 0
City & Suburban	340,000	4 0 0	4 0	Aug., 1904	5 2 6	5 5 0
Consol. Gold-Fields	2,000,000	1 0 0	2 6	Nov., 1904	6 10 0	6 12 6
Crown Reef	120,000	1 0 0	9 0	Oct., 1904	15 15 0	16 5 0
De Beers, preferred	800,000	2 10 0	10 0	Aug., 1904	18 1 3	18 3 9
De Beers, deferred	1,000,000	2 10 0	12 6	Aug., 1904	18 0 0	18 2 6
East Rand	990,000	1 0 0	5 0	July, 1903	8 7 6	8 10 0
Ferreira	90,000	1 0 0	22 6	Aug., 1904	20 15 0	21 5 0
Geldenhuis	200,000	1 0 0	7 0	Aug., 1904	5 10 0	5 12 6
Geduld	400,000	1 0 0	rts.	Mar., 1902	6 13 9	6 16 3
Henry Nourse	125,000	1 0 0	8 0	Aug., 1904	8 5 0	8 10 0
Jubilee	50,000	1 0 0	5 0	Aug., 1904	4 10 0	4 15 0
Jumpers	100,000	1 0 0	2 6	May, 1904	2 17 6	3 2 6
Langlaagte	470,000	1 0 0	2 0	Aug., 1904	3 16 3	3 18 9
May	288,750	1 0 0	3 0	Aug., 1904	4 0 0	4 2 6
Meyer & Charlton	100,000	1 0 0	5 0	Aug., 1904	5 5 0	5 10 0
Modderfontein	290,000	1 0 0	rts.	Apr., 1902	9 13 9	9 16 3
Namaqua	94,331	2 0 0	3 0	Dec., 1903	3 0 0	3 5 0
New Jagersfontein	200,000	5 0 0	15 0	Oct., 1904	27 5 0	27 15 9
New Primrose	325,000	1 0 0	3 0	Aug., 1904	3 11 3	3 13 9
Rand	1,795,956	5 0	5 0	Aug., 1902	10 13 9	10 16 3
Robinson	750,000	5 0 0	6 0	Aug., 1904	9 12 6	9 17 6
Robinson Deep	950,000	1 0 0	3 0	Aug., 1904	5 5 0	5 7 6
Rose Deep	425,000	1 0 0	3 0	Aug., 1904	8 12 6	8 17 6
Salisbury	100,000	1 0 0	2 0	Sept., 1904	1 15 0	2 0 0
Village Main Reef	400,000	1 0 0	4 0	July, 1904	6 10 0	6 15 0
Wemmer	80,000	1 0 0	12 6	July, 1904	10 10 0	11 0 0

*Ex-dividend.

LONDON (By Cable).*

Company.	Oct. 26			Nov. 2			Company.	Oct. 26			Nov. 2		
	£	s.	d.	£	s.	d.		£	s.	d.	£	s.	d.
Camp Bird	1	8	9	1	8	6	Esperanza	1	17	6	1	19	4½
Con. Gold Fields	7	1	3	6	18	9	Modderfontein	10	0	0	10	1	1½
De Beers	18	2	6	18	0	0	Rand Mines	10	15	0	10	13	9
Dolores	1	5	3	1	5	0	Rio Tinto	†58	17	6	†58	15	0
East Rand	8	10	7½	8	6	3	Simmer & Jack	1	18	9	1	18	9
El Oro	1	1	10½	1	3	1½	Tomboy	1	3	1½	1	0	0

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York. †Ex-dividend.

PARIS.

Company.	Location.	Capital Stock.	Par value.	Latest dividend.	Prices. Opening.	Prices. Closing.
		Francs.	Fr.	Fr.	Fr.	Fr.
Anzin, Coal	France	....	....	290.00	5,725.00	5,710.00
Boleo, c	Lower Cal	12,000,000	500	104.17	2,245.00	2,260.00
Champ d'Or, g	S. Africa	3,375,000	25	3.75	16.75	16.75
Courrieres, Coal	France	600,000	500	110.00	2,910.00	2,949.00
Fraser River, g	Brit. Col	250,000	25	....	5.50	5.50
Huanchaca, s	Bolivia	40,000,000	125	2.50	92.75	93.75
Laurium, z. l	Greece	16,300,000	500	25.00	309.00	309.00
Malfidano, z	Italy	12,500,000	500	50.00	625.00	630.00
Metaux, Cie. Fran. de	France	25,000,000	500	22.50	510.00	505.00
Mokta-el-Hadid, i. l	Algeria	18,312,000	500	40.00	1,022.00	1,010.00
Nickel, n	N. Caledonia	15,000,000	250	22.50	639.00	610.00
Penarroya, Coal	Spain	....	500	45.00	1,130.00	1,136.50
Vielle Montagne, z	Belgium	9,000,000	30	30.00	778.00	778.00

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. s—Silver. z—Zinc.

DIVIDENDS.

GOLD, SILVER, LEAD, QUICKSILVER AND ZINC COMPANIES—UNITED STATES.

Name and Location of Company.	Author-ized Capital.	Shares. Issued.	Par Val $	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Acacia, g. Colo.	$1,500,000	1,443,000	1		$57,560	Apr. 1903	$0.01
Adams, s.l.c. Colo.	1,500,000	150,000	10		738,500	Oct. 1902	.05
Alaska-Mexican, g. Alaska	1,000,000	180,000	5	$135,000	708,381	Oct. 1904	.30
Alaska-Treadwell, g Alaska	5,000,000	200,000	25	525,000	5,570,000	Oct. 1904	1.00
Amalgamated, c Mont	155,000,000	1,530,879	100	3,077,720	25,812,127	Nov. 1904	.50
Am.Sm.& Ref.,com U. S.	50,000,000	500,000	100	2,500,000	2,500,000	Oct. 1904	1.25
Am.Sm & Ref. pf. U. S.	50,000,000	500,000	100	3,500,000	15,891,553	Oct. 1904	1.75
Anaconda, c. Mont	30,000,000	1,200,000	25	1,200,000	24,450,000	Nov. 1904	.50
Annie Laurie, g. Utah	5,000,000	25,000	100	137,500	412,500	Oct. 1904	.50
Arizona, c. Ariz.	3,775,000			821,245	5,489,503	Oct. 1904	
Bald Butte, g.s. Mont	250,000	200,000	1	25,000	1,337,148	Jan. 1904	.12½
Big Six, s.l. Colo.	500 000	500,000	1		17,500	Nov. 1903	.00½
Bonanza King, g. Colo.	1,000,000	1,000,000	1	5,000	5,000	Feb. 1904	.00½
Boston & Colo. Sm Colo.	750,000	15,000	50		402,350	Oct. 1902	.75
Boston & Mont Mont	3,750,000	150,000	25	1,050,000	29,375,000	July 1904	3.00
Breece, l.s. Colo.	5,000,000	200,000	25		200,000	June 1903	.05
Bunker Hill & Sull. Idaho	3,000,000	300,000	10	588,000	2,114,000	Oct. 1904	.25
Butler-Liberal, g.s. Utah	500,000	500,000	1		2,500	Dec. 1903	.00½
Butte & Boston, c Mont	2,500,000	200 000	25	200.000	1,800,000	Feb. 1904	1.00
Calumet&Arizona, c Ariz.	2,500,000	200 000	10	900,000	1 300,000	Sept. 1904	1.50
Calumet & Hecla, c Mich	2,500,000	100,000	25	3,000,000	86,350,000	Sept. 1904	10.00
Camp Bird, g. Colo.	5,500,000	820,000	5	787,200	1,754,904	Nov. 1904	.18
Cashier Colo	1,000,000	900,000	1	8,340	26,160	Apr. 1904	.00½
Center Creek, l.z. Mo.	1,000,000	10,000	10	40,000	170,000	Oct. 1904	.10
Central Eureka, g Cal.	4,000,000	398,425	10	171,332	407,317	Oct. 1904	.05
Central, l. Mo.	1,000,000	10,000	100	40,000	425,000	Oct. 1904	.50
Century, g.s.l Utah	150,000	150,000	1	20,000	28,000	July 1904	.02
C. K. & N., g. Colo.	1,500,000	1,431,900	1	128,871	200,466	Oct. 1904	.02
Clinton, g.s. Colo.	100,000	1,000	100		60,000	Dec. 1903	.30
Con. Mercur, g Utah	5,000,000	1,000,000	5		1,030,000	May 1903	.03
Continental, g. Mo.	550,000	22,000	25	35,200	88,000	Oct. 1904	.40
Daly-West, g.s.l. Utah	3,600,000	180,000	20	900,000	4,391,000	Oct. 1904	.40
De Lamar, g.s Idaho	400,000	67,180	5	56,430	2,796,770	Oct. 1904	.48
Deadwood-Stand,pf So.Dak.	600,000	600,000	1		6,000	Dec. 1903	.01
Doe Run, l. Mo.	1,500,000	15,000	100	90,000	717,072	Oct. 1904	1.50
Elkton Con., g Colo.	3,000,000	2,500,000	1		1,404,461	Mar. 1902	.04
El Paso, g. Colo.	2,500,000	2,450,000	1	159,250	323,550	Oct. 1904	.02
Federal Sm., com Idaho	10,000,000	52,500	100	157,500	157,500	Sept. 1904	1.50
Federal Sm., pf Idaho	20,000,000	105,000	100	551,250	735,000	Sept. 1904	1.75
Gemini, g.s.l Utah	500,000	5,000	100	150,000	1,200,000	Oct. 1904	10.00
Gold Coin, g Colo.	1,000,000	1,000,000	1		1,230,000	Jan. 1903	.01
Gold King Colo.	1,000,000	936,850	1	23,422	482,478	Nov. 1904	.01
Golden Cycle, g Colo.	2,000,000	1,500,000	1		303,750	Aug 1903	.03
Grand Central, g Utah	250,000	250,000	1	175,000	1,066,250	Aug. 1904	.10
Gwin, g. Cal.	1,000,000	100,000	10		246,500	Dec. 1902	.15
Hecla, s.l. Idaho	250,000	1,000,000	½	30.000	150.000	May 1904	.01
Hercules-Horsh'e, g Cal.	1,000,000	340,000	1	2.250	2.250	June 1904	.00½
Homestake, g. So.Dak	21,840,000	218,400	100	546,000	12,913,750	Oct. 1904	.25
Horn Silver, g.s.c.z.l Utah	10,000,000	400.000	25	60.000	5,422 000	Sept. 1904	.05
Iowa, g.s.l. Colo.	1,666,667	1,666,667	1	66.668	403.505	Oct. 1904	.01
Iron Silver, Colo.	10 000,000	500,000	20	250.000	3,100,000	Oct 1904	.10
Jamison, g Cal.	3,900,000	390,000	10	46.800	167.700	Oct. 1904	.03
Kendall, g. Mont	2,500,000	500,000	5	300.000	605,000	Oct. 1904	.05
Liberty Bell, g Colo.	700,000	130,349	1	39,104	130,337	Apr. 1904	.15
Lightner, g. Cal.	125,000	102,255	1	54,541	241,156	Oct. 1904	.05
Lyon, s.l. Mo.	50,000	4,000	10	1,200	1,200	Apr. 1904	.30
Mammoth, g s.l. Utah	10,000,000	400,000	25	20,000	1,880,000	July 1904	.05
Mary McKinney, g. Colo.	1,000,000	1,000,000	1	90,000	650,000	Oct. 1904	.03
Mine La Motte, l. Mo.	3,300,000	300,000	10	60,000	300,000	Jan. 1904	.20
Mines Co. of Am. U. S.	2,000,000	2,000,000	1	300,000	765,000	Oct. 1904	.01½
Modoc, g.s. Colo.	500,000	500,000	1		270,000	Dec. 1903	.01
Mont. Ore Purch. Mont	2,500,000	81,000	25	486,000	3,780,000	Nov. 1904	2.00
Mont. Tonopah, g Nev	1,000,000	885,000	1		42,750	Dec. 1903	.05
Mountain, c. Cal.	6,250,000	250,000	25		3,776,250	May 1903	1.57
Nat. Lead, pf U. S.	15,000,000	149,040	100	782,460	14,754,628	Sept. 1904	1.75
Nevada Keystone, g Nev	1,000,000	638,877	1	19,166	61,790	Feb. 1904	.03
New Century, z Mo.	150,000	150,000	1	7,500	7,500	Oct. 1904	.00½
New Idria, q. Cal.	500,000	100,000	5	150,000	670,000	Oct. 1904	.30
New Jersey, z. U. S.	10,000,000	100.000	100	900 000	6,900,000	Aug. 1904	3.00
North Star, g. Cal.	2,500,000	250,000	10	62,500	768,856	July 1904	.25
Northern Light, g.s Utah	2,000,000	400,000	5	20,000	20,000	Feb. 1904	.05
Old Gold, g. Colo.	2,101,150	2,101,150	1	10,506	10,506	Mar. 1904	.00½
Ontario, s.l. Utah	15,000,000	150,000	100		14,917,000	Dec. 1902	30
Ophir, g.s. Nev	302,400	100,800	3	221,850	1,797,400	July 1904	.25
Osceola, c Mich	2,500,000	96,150	25	192,300	4,439,600	July 1904	1.00
Oustomah, g. Cal.	250,000	250,000	1	12,500	12,500	Mar. 1904	05
Parrot, c. Mont	2,300,000	229,850	10	114,925	5,887,860	Aug 1904	.50
Pennsylvania, g. Cal.	5,150,000	51,500	100	46,500	238,575	Oct. 1904	.10
Portland,g Colo.	3,000,000	3,000,000	1	720,000	5,377,080	Oct. 1904	.06
Quicksilver, pf. Cal.	4,300,000	43,000	100		1,931,411	May 1903	.50
Quilp, g. Wash.	1,500,000	1,500,000	1	15,000	15,000	Apr. 1904	.01
Quincy, c Mich	2,500,000	100,000	25	500,000	14,620,000	Aug. 1904	2 50
Red Bird, g.s.c.l. Mont	1,500,000	300,000	5	30,000	66,000	Oct. 1904	.01
Rob Roy, z. Mo.	15,000	13,825	1	692	2,945	May 1904	.03
Rocco Homest'k,l.s Nev.	300,000	300,000	1	4,000	94,000	Jan. 1904	.01
Sacramento, g Utah	5,000,000	1,000,000	5	20,000	213,000	Aug. 1904	.00½
Salvator, g.s.l. Utah	200.000	200.000	1	6.500	6.500	Aug. 1904	.01
St. Joseph, l. Mo.	6,000,000	375,000	10	168,750	4,003,250	Sept. 1904	.15
Silver Hill, g.s Nev	180,000	180,000	1	18.000	46.800	Mar. 1904	.05
Silver King, g.s.l Utah	3,000,000	150,000	20	1,100.000	8,450,000	Oct. 1904	.66⅔
South Swansea. Utah	300,000	300 000	1	3,000	168.000	Apr. 1904	.01
Spearfish, g., pf So.Dak.	1,000,000	882,000	1	13,230	110,250	Oct. 1904	.00½
Specie Payment, g. Colo.	1,000,000	1,000,000	1		65,190	Oct. 1903	.01
Standard Con., g.s. Cal.	2,000,000	178,394	10		1,160,331	Sept. 1903	10
Standard, c. Ariz.	500,000	500,000	1		40.000	Sept. 1903	.05
Stratton'sIndepend Colo.	5,500,000	1,000,007	5		4,130,860	Dec. 1903	.12½
Tamarack, c. Mich	1,500,000	60,000	25	90,000	8,580,000	Jan. 1904	1.50
Tennessee, c. Tenn	5,000,000	175,000	25	218,750	437,500	Jan. 1904	1.25
Tetro, g.l. Utah	300,000	300,000	1	15,000	15.000	Nov. 1904	.01
Tomboy, g.s. Colo.	1,500,000	300,000	5		1,244,000	July 1902	.24
Tonopah Alpine, g. Nev	700,000	700,000	1		70,000	Dec. 1903	.10
Town Topics, g s. Colo.	1,000,000	1,000,000	1		50,000	Nov. 1903	.00½
Trinity County, g Cal.	1,000,000	99,002	10		34,561	July 1903	.05
Uncle Sam. Utah	200,000	200,000	1	10,000	55,000	Oct. 1904	.02½
United (Creede), g. Colo.	500,000	500,000	1	40,000	85,000	Oct. 1904	.02
United, c., pf Mont	5,000,000	50,000	100	300,000	750,000	Nov. 1904	3.00
United, z.l., com. Mo.	5,000,000	78,900	5		30,725	Oct. 1903	.05
United, z.l., pf. Mo.	1,000,000	18,998	25	28,497	153,853	Oct. 1904	.50
United Verde, c. Ariz.	3,000,000	300,000	10	1,350,000	16,410,322	Sept. 1904	.75
U.S.Red.&Ref.,cm Colo.	6,000,000	59,188	100		414,078	Oct. 1903	1.00
U.S.Red.&Ref., pf. Colo.	4,000,000	39,458	100		492,821	Oct. 1903	1.50
United States,g.s.c Utah	21,500,000	480,000	25	210,000	210,000	Aug. 1904	.50
Utah, g Utah	1,000,000	100,000	10	4,000	225,000	June 1904	.01
Utah Con., c. Utah	1,500,000	300,000	5	900,000	2,586,000	July 1904	1.50
Vindicator Con., g. Colo.	1,500,000	1,100,000	1	99,000	1,214,000	Oct. 1904	.03
Waldorf, g Colo.	3,000,000	3,000,000	1		15,000	Aug. 1904	.00½
Wasp No. 2, g. So.Dak.	500,000	147,900	1	16,269	234,679	June 1904	.03
Wolverine, c. Mich	1,500,000	60,000	25	450,000	1,770,000	Oct. 1904	4.00
Yellow Aster, g Cal.	1,000,000	100,000	10	30,000	583,789	Feb. 1904	.15

COAL, IRON AND OTHER INDUSTRIALS—UNITED STATES.

Name and Location of Company.	Author-ized Capital.	Shares. Issued.	Par Val $	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Ala. Con., C.& I., pf Ala.	$2,500,000	$24,638	100	$129,351	$819,031	Sept. 1904	$1.75
Allis-Chalmers, pf. U. S.	25,000,000	200,000	100	350,000	3,213,750	Feb. 1904	1.75
Alma Oil. Cal.	400,000	380,000	1		45,600	Dec. 1903	.03
Amer.Ag. Chem.,pf. U. S.	20,000,000	181,350	100	535,990	5,206,750	Apr. 1904	3.00
American Cement. Pa.	2,000,000	200,000	10	160,000	700,000	July 1904	.40
American Coal. Md.	1,500,000	50,000	25	125,000	1,557,500	Sept. 1904	1.25
Bon Air C. & I., pf. Tenn	2,500,000	18,803	100	84,615	221,551	July 1904	1.50
Cambria Steel. Pa.	50,000,000	900,000	50	1,350,000	7,800,000	Aug. 1904	.75
Caribou Oil. Cal.	100,000	80,000	1	5,600	5,600	Sept. 1904	.07
Central C.&C.,com. Mo.	5,125,000	51,250	100	307,500	858,750	Oct. 1904	1.50
Central C.& C., pf. Mo.	1,875,000	18,750	100	93,748	890,620	Oct. 1904	1.25
Central Oil W. Va.	1,500,000	60,000	25	45,000	197,500	Aug. 1904	.25
Claremont Oil Cal.	500,000	450,000	1	22,500	22,500	Oct. 1904	.01
Colo. Fuel & I., pf. Colo.	2,000,000	20,000	100		1,560,000	Feb. 1903	4.00
Colum.&Hock.C&I Ohio	70,000,000	69,244	100	51,933	138,464	Aug. 1904	.25
Consolidated Coal Ill.	5,000,000	50,000	100	150,000	450,000	July 1904	1.00
Consolidation Coal. Md.	10,250,000	102,500	100	410,000	6,946,650	Feb. 1904	4.00
Crucible Steel, pf. U. S.	25,000,000	250,000	100		5,250,000	Sept. 1903	1.75
Dabney Oil. Cal.	1,200,000	1,000,000	1	37,500	182,500	Feb. 1904	.03⅛
Empire S. & I., pf. U. S.	5,000,000	23,700	100	44,550	611,900	July 1904	1.50
Esperanza Oil. Cal	125,000	125,000	1	2,500	2,500	Oct. 1904	.01
Fairmont Coal W. Va	12,000,000	120,000	100	240,000	240,000	Feb. 1904	2.00
Four Oil Cal.	500,000	208,700	1	20,870	81,232	Oct. 1904	.01
General Chem., com U. S.	12,500,000	74,103	100		1,300,507	Dec. 1903	1.25
General Chem., pf. U. S.	12,500,000	100.000	100	600,000	3,175,178	Oct. 1904	1.50
Giant Oil. Cal.	800,000	800,000	1		144,000	Jan. 1904	.02
Home Oil Cal.	100,000	100,000	1	15,000	507,500	Oct. 1904	.02½
Houston Oil, pf Tex	7,500,000	75,000	100		896,500	Feb. 1903	3.00
Imperial Oil Cal.	1,000,000	100,000	100	220,000	720,000	Nov. 1904	.20
Ill. Crude Oil. Cal.	200,000	200,000	1	7,500	7,500	Oct. 1904	.01½
Jeff.&Cl'f.C.&I.,cm Pa.	1,500,000	15,000	100	75,000	225,000	Aug. 1904	5.00
Jeff.& Cl'f.C.&I., pf Pa.	1,500,000	15,000	100	75,000	675,000	Aug. 1904	2.50
Keystone Oil Colo.	2,000,000	2,000,000	1	8,000	8,000	July 1904	.00⅛
Lehigh Coal & Nav Pa	14,346,650	286,933	50	502,133	21,543,582	May 1904	1.75
Maryland Coal, pf. Md.	2,000,000	18,850	50	65,975	1,112,110	June 1904	3.00
Monong.R.Coal, pf Pa.	10,000,000	97,300	100	347,165	3,124,485	Jan. 1904	3.50
Monte Cristo Oil Cal.	500,000	500,000	1	40,000	75,000	Oct. 1904	.01
National Carbon, pf U. S.	4,500,000	45.000	100	236,250	1,811,250	Aug. 1904	1.75
New Central Coal. Md.	1,000,000	50.000	20	20,000	270,000	Mar. 1904	40
Ohio & Ind. Gas. U. S.	10,000,000	900,000	100		1,440.000	Dec. 1903	1.00
Oil City Petroleum Cal.	500,000	500,000	1	20,000	20,000	Nov. 1904	.00½
Pacific Coast Borax Cal.	2,000,000	19,000	100	362.000	1,896,500	Oct. 1904	1.00
Peerless Oil. Cal.	1,000,000	92,000	10	128,720	319,120	Nov. 1904	.14
Penna. Salt. Pa	3,000,000	60.000	50	360.000	13,810,000	Oct. 1904	3.00
Penna. Steel. Pa	25,000,000	168,214	100	1,177,498	4,683,248	Nov. 1904	3.50
Phila. Gas, com Pa	28,953,029	579,061	50	1,595,552	5,012,383	Nov. 1904	.75
Phila. Gas, pf. Pa	5,744,813	114,896	50	287,212	1,439,885	June 1904	1.25
Pittsburg Coal, pf Pa	32,000,000	297,012	100	2,079,084	10,395,420	Oct. 1904	1.75
Pittsburg Oil Cal.	300,000	240,000	1		48,000	Dec. 1903	.02½
Pocahontas Coll.,pf W. Va.	1,500,000	15,000	100	75,000	265,000	Oct. 1904	.50
Rep.Iron & Steel,pf U. S.	25,000,000	204,169	100		6,053,476	Oct. 1903	1.75
San Joaquin Oil. Cal.	100,000	100,000	1	440,000	625,000	Mar. 1904	2.20
Shelby Iron Ala.	1,000,000	10,000	100		840,000	Nov. 1903	5.00
Sloss-Sheffield, pf. Ala.	20,000,000	67,000	100	469.000	2,205,000	Oct. 1904	1.75
Somerset Coal Pa.	4,000,000	40,000	100	80,000	80,000	Feb. 1904	2.00
St. Bernard C. & C. Ky. Ten	1,000,000	10,000	100		770,000	Dec. 1903	6.00
Standard Oil U. S.	100,000,000	970,000	100	28,130,000	236,110,000	Sept. 1904	5.00
Tenn. C. I., pf. Tenn	248.000	2.480	100	19.840	326.944	Nov. 1904	2.00
Texas& Pacific Coal Texas	2,000,000	20.000	100	30,000	1,890,000	Oct. 1904	1.50
Thirty-three Oil. Cal.	500,000	100.000	5	100,000	340,000	Oct. 1904	.10
Thomas Iron Pa	2,500,000	25,000	200		200,000	Aug. 1903	4.00
Union Oil Cal.	10,000,000	52,672	100	73,740	889,682	Apr. 1904	.70
Union Nat'l Gas. Pa	8,000,000	22,500	100	135,000	315,000	July 1904	2.00
U.S.Steel Corp., cm U. S.	550,000,000	5,083 025	100		53,360,978	Dec. 1903	1.50
U.S.Steel,Corp.,pf. U. S.	360,281,100	3,602,811	100	25,220,832	118,097,735	Nov. 1904	1.75
Va.Carolina Ch.,cm U. S.	38,000,000	279,844	100		3 678,829	June 1903	1 25
Va.Carolina Ch.,pf. U. S.	20,000,000	180.000	100	1,200.000	8,220,869	Oct. 1904	2.00
Westmoreland Coal Pa.	3,000,000	60.000	50	30,000	8,280,000	Oct. 1904	.50
West Shore Oil. Cal.	100,000	100,000	1	35,000	140,000	Oct. 1904	.05

CANADA, CENTRAL AND SOUTH AMERICA, MEXICO.

Name and Location of Company.	Author-ized Capital.	Shares. Issued.	Par Val $	Dividends. Paid in 1904.	Total to Date.	Latest. Date.	Amt.
Amistad y Conc'dia Mex.	$480,000	9,600	50	$76,362	$241,648	Oct. 1904	$1.55
Barreno, g.s. Mex.	12,000	2,400	5	6,036	69,982	Sept. 1904	.90
Bart de MedinaMil Mex.	50.000	2,000	25	16,103	95,831	Oct. 1904	.69
Butters' Salvador,g Salv.	750.000	150,000	5	150,000	525,000	Oct. 1904	.25
Cariboo McKin'y,gs B. C.	1,250,000	1,250,000	1	50,000	546,837	Feb. 1904	.04
Carmen, g.s. Mex.	27,500	1,100	25	5,038	83,654	Oct. 1904	2.29
Carmen-Guanaj,g.s Mex.	725,000	145,000	5		27,750	Oct. 1903	.12½
Cinco Senores. Mex.		2,000			711,935	July 1903	4.10
Copiapo, c. Chile	1,125,000	112,500	10	135,000	3,000,900	Oct. 1904	1.20
Crow's Nest Pass. N. S.	3.500.000	121,486	25	172,524	968,947	Apr. 1904	2.50
Dominion Coal,com N. S.	15.000.000	150.000	100		1,050,000	Dec. 1903	1.75
Dominion Coal, pf. N. S.	3,000.000	30,000	100	120,000	2,400,000	July 1904	4.00
Dominion I.&S., pf. N. S.	5,000,000	50,000	100		875,000	Sept. 1903	3.50
Dos Estrellas, g.s. Mex.	150.000	3.000	50	134,550	717,375	Oct. 1904	4.60
El Oro, g.s Mex.	5,750.000	1,080,000	5	194.400	2,708,800	July 1904	.18
Esperanza, s.g Mex.	2,275,000	455.000	5	222,950	1,377,149	Oct. 1904	.12
Fraternal, s Mex.	5,000	1,000	5	35,250	86,513	Oct. 1904	5.75
Granby Con B. C.	13,363,030	1,336,303	10		133,630	Dec. 1903	.10
Greene Con., c Mex.	8,640.000	864,000	10	777,600	1,429,420	Oct. 1904	.30
Guggenheim Expl Mex.	17,000,000	105 000	100	735,000	1,286,250	Oct. 1904	1.75
Le Roi No. 2, g. B. C.	3,000,000	120,000	35	57,600	345,600	June 1904	.24
Mex. Coal & Coke Mex.	5,000,000	50,000	100	150,000	130,000	June 1904	3.00
Natividad, s.g Mex.	36,000	2,400	15	120,000	392,463	Oct. 1904	5.00
N.Y.& Hond. Ros. C. A.	1,500,000	150,000	10	120,000	1,905,000	Oct. 1904	.10
N. S. St.&Coal,com. N. S.	5,000,000	50,000	100	273 600	788,600	Nov. 1904	1.00
N. S. St.& Coal, pf. N. S.	2,000,000	10,300	100	61,600	267,800	Nov. 1904	2.00
Penoles, s.g. Mex.	125,000	2,500	50	449,500	2,937,614	Oct. 1904	18.39
Providence, g.s B. C.	200,000	40,000	5	20,000	22,224	Oct. 1904	.10
Real del Monte Mex.		2,554		34,479	2,961,363	Oct. 1904	4.60
San Francisco Mill. Mex.	150,000	6,000	25	20,520	307,680	Oct. 1904	.92
San Rafael Mex.	60,000	2,400	25	229.481	2,265,998	Oct. 1904	
Soledad, s.l. Mex.	19,200	960	20	62,806	327,448	Oct. 1904	9.20
Sopressa, g.s. Mex.	19.200	960	20	23,696	223.762	Oct. 1904	2.30
Sta. Gertrudis, g.s. Mex.	1,920.000	38,000	50	81,184	2,861.344	Sept. 1904	
St. John del Rey, g. Brazil	3,000,000	546,265	5		14,158,949	Dec. 1903	.12
Sta. Maria de la Paz Mex.		2,400		38,026	2,000,399	Oct. 1904	2.30
Torreon Metallurg'l Mex.	1,500,000	30,000	50		269,500	May 1903	8.98
Tyee, c. B. C.	940,000	180.000	5	43,200	43,200	Apr. 1904	.24
Union Mill Mex.	150,000	3,000	50	59,663	473,086	Oct. 1904	2.30

NOTE: These dividends are published gratuitously. Readers are invited to send any additions or corrections which they think necessary to complete our list.